

Note:

This is an indicative version of the changes to the National Electricity Rules proposed to be made by the Draft National Electricity Amendment (Improving the NEM access standards – Package 2) Rule 2026. It comprises extracts from Chapters 4, 5 and 10 of version 243 of the National Electricity Rules, together with transitional provisions.

This document is provided for information purposes only. The actual amendments are set out in the draft amending rule for the above project.

The Australian Energy Market Commission does not guarantee the accuracy, reliability or completeness of this indicative mark-up of the National Electricity Rules.

4.3.5 Customer obligations

- (a) All *Schedule 5.3 Participants* having expected peak demands at *connection points* in excess of 10 MW, must provide automatic *interruptible load* of the type described in clause S5.1.10. The level of this automatic *interruptible load* must be a minimum of 60% of their expected demand, or such other minimum *interruptible load* level as may be periodically determined by the *Reliability Panel*, to be progressively automatically *disconnected* **or reduced** following the occurrence of a *power system* under-frequency condition described in the *power system security standards*.

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b) *Schedule 5.3 Participants* must provide their *interruptible load* in manageable blocks spread over a number of steps within under-frequency bands from 49.0 Hz down to 47.0 Hz as nominated by *AEMO*.

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (c) Any *load shedding* capability the subject of an *ancillary services agreement* or *enabled* as a *market ancillary service* can be counted as automatic *interruptible load* provided for the purposes of clause 4.3.5.

4.4A.1 AEMO enablement of system security services

AEMO may, at any time, *enable*:

- (a) any *system security services* to achieve and maintain the *minimum system security requirements*; and
- (b) *system strength services* to achieve and maintain stable *voltage* waveforms for the level and type of *inverter based resources* and ***schedule 5.3a plantmarket network service facilities*** that *AEMO* forecasts would be *dispatched* in the relevant *trading interval* if this were not limited by *system strength services (stable voltage waveform requirements)*,

in accordance with this rule 4.4A and the *Security Enablement Procedures*.

4.4A.4 Enablement principles

When electing the range and quantity of *system security services* to be *enabled* under clause 4.4A.1, *AEMO* must use reasonable endeavours to give effect to the following principles:

- (a) the *system security services* that are *enabled* should be the lowest total cost combination required to achieve and maintain the *minimum system security requirements* and the *stable voltage waveform requirements*;
- (b) a *system security service* should be *enabled* as close as practicable to the relevant *trading interval*, and in any case, *enabled* no more than 12 hours ahead of the *trading interval*;

- (c) a *system security service* should only be *enabled* where, in *AEMO's* reasonable opinion, the *minimum system security requirements* or the *stable voltage waveform requirements* would not be met but for such *enablement*;
- (d) when *enabling* a *system security service* to achieve the *stable voltage waveform requirements*, where such services are required in addition to those required to achieve the *minimum system security requirements*, *AEMO* should:
 - (1) only *enable* a quantity of *system strength services* that is reasonably necessary to achieve *stable voltage waveforms* for the level and type of *inverter based resources* and ~~*schedule 5.3a plant market network service facilities*~~ that *AEMO* projects could be *dispatched* in the relevant *trading interval*; and
 - (2) not *enable* a *system strength production unit* if *enabling* that unit would result in significant adverse effects on *power system efficiency* or *power system emissions*.

4.6.6 System strength impact assessment guidelines

- (a) *AEMO* must make, publish and may amend *system strength impact assessment guidelines* that:
 - (1) in accordance with paragraphs (b) and (b1), set out the methodology to be used by *Network Service Providers* when:
 - (i) undertaking *system strength impact assessments* under clause 5.3.4B; and
 - (ii) calculating a *system strength locational factor* and *system strength quantity*;
 - (2) define, and provide guidance on the calculation of, *available fault levels* at *system strength nodes* including for the purposes of forecasts under clause 5.20C.3(f)(3) and for the calculation of the *system strength locational factor* for a *connection point*;
 - (3) prescribe, for clauses S5.2.5.15(b), S5.3.11(b) and S5.3a.7(b), the methodology for assessing the *short circuit ratio*;
 - (4) provide guidance on the information that must be provided to demonstrate compliance with the *minimum access standard* in clause S5.2.5.15(b), clause S5.3.11(b) or clause S5.3a.7(b) (as applicable), or if the procedures in clause 5.3.4A have been followed, the relevant *negotiated access standard*;
 - (5) ~~prescribe, for the purposes of the definition of *inverter based load* in Chapter 10, the criteria for classification of *plant as an inverter based load*;~~
 - (6) prescribe, for the purposes of the definition of *large inverter based resource* in Chapter 10, the criteria for classification of an *asynchronous generating unit or an asynchronous bidirectional unit*~~*inverter based resource*~~ as a *large inverter based resource* which must take into account *plant* type and size and other matters *AEMO* considers relevant to identifying *inverter based resources* that may

- have a *general system strength impact* above the threshold referred to in subparagraph (b)(7);
- (7) describe how *AEMO* assesses *adverse system strength impacts*; and
 - (8) provide guidance on the methodology to be used by *Network Service Providers* when undertaking modelling to verify the stability of *plant* in accordance with clause 5.3.4B(a2)(4).
- (b) For subparagraph (a)(1)(i), the *system strength impact assessment guidelines* must:
- (1) provide for a two-stage assessment process comprising:
 - (i) a first stage in which a preliminary assessment is undertaken to screen for the need for a full assessment; and
 - (ii) in the circumstances described in clause 5.3.4B(a2)(3), a second stage in which a full *system strength impact assessment* is undertaken;
 - (1A) require the preliminary assessment to be carried out using a simple isolated model such as a single machine infinite bus model;
 - (2) require the full assessment to be carried out using a *power system* model that is reasonably appropriate for conducting *system strength impact assessments* and applicable to the location the *transmission network* or *distribution network* at which the *facility* is or may be *connected* and specified by *AEMO* from time to time for this purpose;
 - (3) exclude from the assessment of the *general system strength impact* the impact on any *protection system* for a *transmission network* or *distribution network*;
 - (4) provide guidance about the different *network* conditions and *dispatch* patterns and other relevant matters that should be examined when undertaking a full assessment;
 - (5) specify the nature of the impacts that *AEMO* considers to be *general system strength impacts* for the purposes of clause 5.3.4B;
 - (6) provide guidance about the matters that must be considered when determining whether a *connection* or alteration will result in a *general system strength impact*;
 - (7) include if applicable any thresholds below which an impact may be disregarded for the purposes of clause 5.3.4B(f)(3); and
 - (8) provide general guidance about options for *system strength remediation schemes* and *system strength connection works*.
- (b1) For subparagraph (a)(1)(ii), the *system strength impact assessment guidelines* must:
- (1) specify a methodology for calculation of the *system strength locational factor* for a *connection point*, which must be representative of the impedance between the *connection point* and the applicable *system strength node* and must use *available fault level* as the basis for the methodology;

- (2) provide guidance about the circumstances in which a *system strength locational factor* is not reasonably able to be determined or would be manifestly excessive;

Example

Where the *system strength locational factor* tends to infinity, or where it would result in a *system strength charge* that could not reasonably be expected to be paid in preference to *system strength connection works* or a *system strength remediation scheme*.

- (3) specify a methodology for calculation of the *system strength quantity* for a *connection point*, which must:

- (i) include the use of:

- (A) the *short circuit ratio* for the *connection point*; and
(B) the *active power capability*, the *power transfer capability* or the *maximum demand* (as applicable) for the *connection point*,

each as agreed in accordance with clause S5.2.5.15, clause S5.3.11 or clause S5.3a.7 (as applicable) and recorded in the relevant *performance standards* for the *plant connected* at the *connection point*; and

- (ii) reflect the *adverse system strength impact* of a new *connection* or alteration to a *connected plant* as well as any additional amount by which it reduces the *available fault level* at the *connection point* for the new *connection* or *connected plant*,

so as to produce a result that is an approximation of the level of impact that would be required to be remedied or avoided by a *system strength remediation scheme* for that *connection point*, as assessed by *AEMO* having regard to the need to avoid a full *system strength impact assessment*; and

- (4) provide guidance on the inputs and assumptions that may be used by a *Network Service Provider* when calculating an indicative *system strength quantity* in accordance with clause 5.3.4B(a2)(2A).
- (c) Subject to paragraph (d), *AEMO* must comply with the *Rules consultation procedures* when making or amending the *system strength impact assessment guidelines*.
- (d) *AEMO* may make minor or administrative amendments to the *system strength impact assessment guidelines* without complying with the *Rules consultation procedures*.
- (e) *AEMO* must provide the model referred to in subparagraph (b)(2) to a *Local Network Service Provider* or, subject to paragraph (f), to a person seeking a *connection* or proposing to alter *connected plant* referred to in clause 5.3.4B(a) who requests the model in connection with a *system strength impact assessment*.
- (f) If *AEMO* receives a request under paragraph (e) from a person seeking a *connection* or proposing to alter *connected plant* referred to in clause 5.3.4B(a):

- (1) *AEMO* must treat the request as if it were information reasonably required by a *Registered Participant* under clause 3.13.3(k)(2) and *AEMO* is only required to provide the model referred to in subparagraph (b)(2) (or the source code for that model) in the form contemplated by clause 3.13.3(l)(2); and
- (2) *AEMO* may require a *Connection Applicant* who is not a *Registered Participant* to give an undertaking in a form satisfactory to *AEMO* to comply with rule 8.6 as if the *Connection Applicant* were a *Registered Participant* as a condition of providing a model to the *Connection Applicant* under paragraph (e).

4.14 Acceptance of Performance Standards

- (a) [Deleted]
- (b) [Deleted]
- (c) [Deleted]
- (d) [Deleted]
- (e) [Deleted]
- (f) [Deleted]
- (g) [Deleted]
- (h) [Deleted]
- (i) [Deleted]
- (j) [Deleted]
- (k) [Deleted]
- (l) [Deleted]
- (m) [Deleted]
- (n) *AEMO* must establish and maintain a register of the *performance standards* applicable to ~~*Registered Participants*~~ *Schedule 5 Participants' plant* as advised to *AEMO* in accordance with clauses 5.2.3(c1)(2), 5.3.7(g)(1), 5.3.8(f), 5.3.9(h) or 5.3.12(h), or established in accordance with rule 4.16 or amended in accordance with rule 4.14(p).
- (n1) By 1 July each year, *AEMO* must provide to the *AER* an up-to-date copy of the register of *performance standards* required to be maintained under rule 4.14(n), including a copy of the corresponding *performance standards*.
- (n2) The *AER* may, at any time, request *AEMO* to provide:
 - (1) an up-to-date copy of the register of *performance standards* (current as at the date of the *AER's* request) including a copy of the corresponding *performance standards*; or
 - (2) a copy of the *performance standards* relating to specified *plant*,
if, in the reasonable opinion of the *AER*, it is required for the performance or exercise of the *AER's* functions.

- (n3) Following a request under subparagraph (n2), *AEMO* must provide the information requested within:
- (1) 10 *business days* for a request under subparagraph (n2)(1); and
 - (2) 5 *business days* for a request under subparagraph (n2)(2), unless the *AER* agrees otherwise.
- (o) **[Deleted]**
- (p) A *performance standard* applicable to a *Schedule 5 Participant* (whether or not a *Registered Participant*) may be amended at any time by agreement between the relevant *Schedule 5 Participant*, the *Network Service Provider* (if applicable) and, if the *performance standard* relates to an *AEMO advisory matter*, *AEMO*, if:
- (1) where the *performance standard* was established under a transitional arrangement in rule 4.16 or 4.17, the amendment is consistent with the actual *plant* capability agreed between *AEMO*, the relevant *Schedule 5 Participant* and the *Network Service Provider* (if applicable), even if it is less than the relevant *minimum access standard* that applied to *applications to connect* at the time of agreement; or
 - (2) the amendment satisfies all requirements for *negotiated access standards* under clause 5.3.4A(b); or
 - (3) the amendment satisfies all requirements to be an *automatic access standard*.

Note

If clause 5.3.7(g) applies in respect of the *Schedule 5 Participant's connection agreement*, clause 5.3.8(f) will require any updated *performance standards* to be notified to *AEMO*.

- (q) **[Deleted]**
- (r) The *Network Service Provider* may as a condition of considering an amendment proposed under rule 4.14(p) require payment of a fee to meet the reasonable costs anticipated to be incurred by the *Network Service Provider*, other *Network Service Providers* and *AEMO*, in the assessment of the proposed amendment.
- (s) The *Network Service Provider* must require payment of a fee under rule 4.14(r) if so requested by *AEMO*.
- (t) On payment of the required fee referred to in rule 4.14(r), the *Network Service Provider* must pay the costs anticipated to be incurred by the other *Network Service Providers* and *AEMO*, as appropriate.

5.2.6A AEMO review of technical requirements for connection

- (a) *AEMO* must conduct a review of some or all of the technical requirements set out in schedule 5.2, schedule 5.3 and schedule 5.3a at least once in every five year period (and may conduct a review more frequently if *AEMO* considers necessary) to assess whether those requirements should be amended, having regard to:
- (1) the *national electricity objective*;

- (2) the need to achieve and maintain *power system security*;
 - (3) changes in *power system* conditions; and
 - (4) changes in technology and capabilities of *facilities* and *plant*.
- (b) When conducting a review under this clause 5.2.6A, *AEMO* must consult with, among other affected parties, the *Reliability Panel*.
- (c) *AEMO* must commence a review under this clause 5.2.6A with the publication of an approach paper on its website, which must:
- (1) set out the scope of the review, including the nature and extent of the issues to be reviewed;
 - (2) describe the technical requirements to be consulted on; and
 - (3) state the date by which a draft report will be published.
- (d) *AEMO* must publish a draft report on its website that:
- (1) sets out *AEMO's* recommendations for any amendments to the technical requirements set out in schedule 5.2, schedule 5.3 and schedule 5.3a and the reasons for those recommendations; and
 - (2) includes an invitation for written submissions to be made to *AEMO* within a period specified in the invitation (which must be at least 30 *business days*) on the technical requirements and recommendations in the draft report and must publish any submissions on its website, subject to obligations in respect of *confidential information*.
- (e) Subject to paragraph (e1), *AEMO* must publish a final report on its website within 12 months of the approach paper's publication under paragraph (c), setting out *AEMO's* recommendations for any amendments to the technical requirements set out in schedule 5.2, schedule 5.3 and schedule 5.3a, having regard to the matters set out in subparagraphs (a)(1) to (4) and any submissions made in response to its invitation under subparagraph (d)(2).
- (e1) The time for publication of the final report under paragraph (e) may be extended by *AEMO* for an additional period of up to 3 months by publishing a notice of extension if *AEMO* considers that there are matters of material complexity or a material change in circumstances requiring an extension. *AEMO* must publish a notice of extension no later than one month prior to the end of the 12 month period referred to in paragraph (e) which sets out the matters of complexity or material change in the circumstances, and how *AEMO* plans to address it, including its plan for engaging stakeholders on those matters.
- (f) As soon as practicable following publication of a final report under paragraph (e), *AEMO* must provide written notification to the *AEMC* as to whether *AEMO* will be submitting a *Rule* change proposal that results from the review.

5.3.7 Finalisation of connection agreements and network operating agreements

- (a) If a *Connection Applicant* wishes to accept an offer to *connect*, the *Connection Applicant* must negotiate and enter into:

- (1) a *connection agreement* with each relevant *Network Service Provider* identified in accordance with clauses 5.3.3(b)(3) and (4) or clauses S5.4A(d) and (e); and
- (2) if applicable, a *network operating agreement* with the *Primary Transmission Network Service Provider*,

and in doing so must use its reasonable endeavours to negotiate in good faith with all parties with which the *Connection Applicant* must negotiate such a *connection agreement* and (if applicable) *network operating agreement*.

- (b) The *connection agreement* must include:
 - (1) proposed performance standards with respect to each of the technical requirements identified in schedules 5.2, 5.3 and 5.3a and each proposed *performance standard* must have been established in accordance with the relevant technical requirement; and
 - (2) a commitment to ongoing compliance with the proposed performance standards, consistent with good electricity industry practice.
- (c) The proposed *performance standards* must be based on the *automatic access standard* or, if the procedures in clause 5.3.4A have been followed, the *negotiated access standard*.
- (d) The provision of *connection* by any *Network Service Provider* may be made subject to gaining environmental and planning approvals for any necessary *augmentation* or *extension* works to a *network* or any *system strength connection works*.
- (e) Where permitted by the applicable law in the relevant *participating jurisdiction*, the *connection agreement* may assign responsibility to the *Connection Applicant* for obtaining the approvals referred to in paragraph (d) as part of the project proposal and the *Network Service Provider* must provide all reasonable information and may provide reasonable assistance for a reasonable fee to enable preparation of applications for such approvals.
- (f) Subject to paragraph (e), each *connection agreement* must be based on the offer to *connect* as varied by agreement between the parties.
- (f1) The parties may agree to have one *connection agreement* between a *Primary Transmission Network Service Provider*, owner of a *dedicated connection asset* or *designated network asset* and a *Transmission Network User* for a *connection*.
- (f2) A *network operating agreement* must be based on the offer to *connect* as varied by agreement between the parties.
- (f3) Paragraph (g) applies in respect of a *connection agreement* if:
 - (1) the relevant *Connection Applicant* is, or will be, a *Registered Participant* for the *plant to be connected*; or
 - (2) the *connection agreement* includes an *AEMO advisory matter*.
- (g) Within 20 *business days* of the execution of a *connection agreement* in respect of which this paragraph (g) applies, the *Network Service Provider* responsible for the *connection point* and the *Connection Applicant* must

jointly notify *AEMO* that a *connection agreement* has been entered into between them and forward to *AEMO* relevant technical details of the proposed *plant* and *connection*, including as applicable:

- (1) details of all *performance standards* that form part of the terms and conditions of the *connection agreement*;
- (2) if the *Connection Applicant* is a *Schedule 5.2 Participant*, the arrangements for:
 - (i) updating the *releasable user guide* and other information required under clause S5.2.4(b); and
 - (ii) informing *AEMO* when the *connection agreement* expires or is terminated;
- (3) the proposed *metering installation*;
- (4) arrangements to obtain physical access to the *metering installation* for the *Metering Provider* and the *Metering Data Provider* for *metering installations* type 4A, 5 and 6;
- (5) the terms upon which a *Registered Participant* is to supply any *ancillary services* under the *connection agreement*; and
- (6) the details of any *system strength remediation scheme* agreed, determined or modified under clause 5.3.4B.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (h) *AEMO* must, within 20 *business days* of receipt of a notice under paragraph (g), advise the relevant *Network Service Provider* and the *Connection Applicant* of whether the proposed *metering installation* is acceptable for those *metering installations* associated with those *connection points* which are classified as *metering installation* types 1, 2, 3 and 4 as specified in schedule 7.4.

5.3A.12 Network support payments and functions

- (a) When negotiating the amount of a *network support payment* with a *Distribution Connected Resource Provider*, the *Transmission Network Service Provider* must take into account the:
 - (1) nature of the *network* support services being provided by the *Distribution Connected Resource Provider*; and
 - (2) extent to which the *Distribution Connected Resource Provider* is being, or will be, compensated for providing those *network* support services by receiving *avoided Customer TUOS charges*.
- (b) Where the relevant *Transmission Network Service Provider* or *Distribution Network Service Provider* decides to implement a *generation* option as an alternative to *network augmentation*, the *Network Service Provider* must:
 - (1) register the *generating unit* or *bidirectional unit* with *AEMO* and specify that the *generating unit* or *bidirectional unit* may be

periodically used to provide a *network* support function and will not be eligible to set *spot prices* when *constrained on* in accordance with clause 3.9.7; and

- (2) include the cost of this *network* support service in the calculation of *transmission service* and *distribution service* prices determined in accordance with Chapter 6 or Chapter 6A, as the case may be.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

5.3.12 Procedure to be followed for alterations to other connected plant

- (a) This clause 5.3.12 applies where a *Schedule 5.3 Participant* ~~specified in clause S5.3.11(a)~~ or a *Schedule 5.3a Participant* ~~specified in clause S5.3a.1a~~ proposes to alter *connected plant* and that alteration will affect the performance of the *plant* relative to a technical requirement in schedule 5.3 or schedule 5.3a (as applicable) that is an *AEMO advisory matter*.
- (b) A *Schedule 5.3 Participant* or *Schedule 5.3a Participant* to whom this clause applies, must submit to the *Network Service Provider* with a copy to *AEMO*:
- (1) a description of the nature of the alteration and the timetable for implementation;
 - (2) in respect of the proposed alteration to the *plant*, details of the design setting data in accordance with the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*;
 - (3) in relation to the technical requirements in ~~clause S5.3.11 or clause S5.3a.7~~ schedule 5.3 or schedule 5.3a (as applicable), the proposed amendments to the *plant's* existing corresponding *performance standard* for that technical requirement; and
 - (4) except where the alteration:
 - (i) relates to *schedule 5.3a plant* that is subject to *transmission service* regulation under Chapter 6A; or
 - (ii) will not affect the performance of the *plant* relative to any of the technical requirements in clause S5.3.11 or clause S5.3a7,
the proposed *system strength remediation scheme* or an election for the *system strength charge* to be payable in relation to the alteration.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (c) Clause 5.3.4A applies to a submission under subparagraph (b)(3).
- (d) Clause 5.3.4B applies to a submission under subparagraph (b)(4). A *Schedule 5.3 Participant* or *Schedule 5.3a Participant* (as applicable) may request the *Network Service Provider* to undertake a preliminary assessment

in accordance with the *system strength impact assessment guidelines* before making a submission under paragraph (b).

- (e) The *Network Service Provider* may as a condition of considering a submission made under paragraph (b), require payment of a fee to meet the reasonable costs anticipated to be incurred by the *Network Service Provider*, other *Network Service Providers* and *AEMO*, in the assessment of the submission.
- (f) The *Network Service Provider* must require payment of a fee under paragraph (e) if so requested by *AEMO*.
- (g) On payment of the required fee referred to in paragraph (d), the *Network Service Provider* must pay such amounts as are on account of the costs anticipated to be incurred by the other *Network Service Providers* and *AEMO*, as appropriate.
- (h) If the application of this clause 5.3.12 leads to a variation to any information of a kind required to be provided to *AEMO* under clause 5.3.7, the *Network Service Provider* and the *Schedule 5.3 Participant* or *Schedule 5.3a Participant* (as applicable) must immediately jointly advise *AEMO*, including the details of any *performance standards* amended pursuant to this clause 5.3.12.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

5.7.2 Right of testing

- (a) A *Registered Participant* or *Schedule 5 Participant*, who has reasonable grounds to believe that equipment owned or operated by a *Registered Participant* or *Schedule 5 Participant* ~~with whom it has a connection agreement (which equipment is associated with the connection agreement)~~ may not comply with the *Rules* or an applicable ~~the connection agreement~~, may request testing or assessment of the relevant equipment by giving notice in writing to the other *Registered Participant* or *Schedule 5 Participant*.
- (b) If a notice is given under clause 5.7.2(a), any test or assessment that requires, or may cause, an *outage* or change to normal operation of any *power system* equipment is to be conducted at a time agreed by *AEMO*.
- (c) The *Registered Participant* or *Schedule 5 Participant* who receives a notice under clause 5.7.2(a) must co-operate in relation to conducting tests or assessments requested under clause 5.7.2(a).
- (d) The cost of tests or assessments requested under clause 5.7.2(a) must be borne by the *Registered Participant* or *Schedule 5 Participant* requesting them, unless the equipment is determined by the tests or assessments not to comply with the *Rules* or the relevant *connection agreement*, in which case all reasonable costs of such tests or assessments must be borne by the owner of that equipment.

- (e) Tests or assessments conducted in respect of a *connection point* under clause 5.7.2 must be conducted using procedures agreed between the relevant *Registered Participant* or *Schedule 5 Participant*, which agreement is not to be unreasonably withheld or delayed.
- (f) Tests or assessments under clause 5.7.2 must be conducted only by persons with the relevant skills and experience.
- (g) A *Transmission Network Service Provider* must give *AEMO* adequate prior notice of intention to conduct a test in respect of a *connection point* to that *Network Service Provider's network*.
- (h) The *Registered Participant* or *Schedule 5 Participant* who requests a test under this clause 5.7.2 may appoint a *representative* to witness the test and the other *Registered Participant* or *Schedule 5 Participant* must permit that appointed *representative* to be present while the test is being conducted.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (i) A *Registered Participant* or *Schedule 5 Participant* who conducts a test or assessment under this clause 5.7.2 must submit a report to the *Registered Participant* or *Schedule 5 Participant* who requested the relevant test or assessment, to *AEMO* (where paragraph (b) applies) and to any other *Registered Participant* whom is likely to be materially affected by the results of the test or assessment, within a reasonable period after the completion of the test or assessment and the report is to outline relevant details of the tests or assessments conducted, including but not limited to the results of those tests or assessments.

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (j) A *Network Service Provider* may attach test equipment or *monitoring equipment* to *plant* owned by a *Registered Participant* or require a *Registered Participant* to attach such test equipment or *monitoring equipment*, subject to the provisions of clause 5.7.1 regarding entry and inspection.
- (k) In carrying out monitoring under clause 5.7.2(j), the *Network Service Provider* must not cause the performance of the monitored *plant* to be *constrained* in any way.

5.7.3 Tests to demonstrate compliance with connection requirements ~~for Generators and Integrated Resource Providers~~

- (a) Each ~~*Generator*~~ *Registered Participant* must, in accordance with ~~the~~ any applicable time frames specified in rule 4.15, provide evidence to any relevant *Network Service Provider* with which that ~~*Generator*~~ *Registered Participant* has a *connection agreement*, and to *AEMO*, that its ~~*plant/generating system*~~ complies with:

- ~~(1) the applicable technical requirements of clause S5.2.5; and~~
- ~~(2) the relevant connection agreement including the performance standards.~~

Note

This paragraph is classified as a tier 3 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (a1) ~~Each Integrated Resource Provider must, in accordance with the time frames specified in rule 4.15, provide evidence to any relevant Network Service Provider with which that Integrated Resource Provider has a connection agreement and to AEMO, that its generating system or integrated resource system (as applicable) complies with:~~
 - ~~(1) the applicable technical requirements of clause S5.2.5; and~~
 - ~~(2) the relevant connection agreement including the performance standards.~~ **[Deleted]**
- (b) **-[Deleted]**
- (c) If a test required by paragraph (a) ~~or (a1)~~ demonstrates that a relevant plant generating system or integrated resource system is does not complying with ~~one or more technical requirements of clause S5.2.5 or the relevant connection agreement~~ or one or more of the *performance standards* then the ~~Generator or Integrated Resource Provider~~ Registered Participant must:
 - (1) promptly notify the relevant *Network Service Provider* and *AEMO* of that fact; and
 - (2) promptly notify the *Network Service Provider* and *AEMO* of the remedial steps it proposes to take and the timetable for such remedial work; and
 - (3) diligently undertake such remedial work and report at monthly intervals to the *Network Service Provider* on progress in implementing the remedial action; and
 - (4) conduct further tests or monitoring on completion of the remedial work to confirm compliance with the relevant technical requirements or *performance standards* (as the case may be).

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (d) If *AEMO* reasonably believes that a ~~generating system or integrated resource systems~~ is schedule 5.2 plant, schedule 5.3 plant or schedule 5.3a plant does not ~~complying~~ meet the requirements of ~~with one or more applicable performance standards in respect of an AEMO advisory matter, or one or more applicable technical requirements of clause S5.2.5 or the relevant connection agreement,~~ *AEMO* may ~~instruct~~ request the ~~Generator or Integrated Resource Provider~~ relevant Schedule 5 Participant to conduct tests ~~within 25 business days~~ to demonstrate ~~that~~ compliance of the relevant ~~generating system or integrated resource system~~ complies with those

~~performance standards or technical requirements~~ plant and the Schedule 5 Participant must comply with that request within 25 business days.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (e) If the tests undertaken in accordance with paragraph (d) provide evidence that the ~~generating system or integrated resource system~~ plant continues to ~~comply with those~~ meet the relevant requirements ~~AEMO must reimburse the Generator or Integrated Resource Provider~~ Schedule 5 Participant for the reasonable expenses incurred as a direct result of conducting the tests.
- (f) ~~If AEMO may give the Schedule 5 Participant a direction regarding the operation of its plant if AEMO:~~
- (1) is satisfied that:
 - (i) a ~~generating system or integrated resource system is~~ Schedule 5 Participant's plant does not ~~complying with~~ meet the ~~relevant~~ requirements of one or more performance standards for that system in respect of ~~one or more of the technical requirements contained in S5.2.5, S5.2.6, S5.2.7 or S5.2.8 and the relevant connection agreement~~ an AEMO advisory matter; or
 - (ii) ~~generating system's or integrated resource system's~~ the performance ~~of a Schedule 5 Participant's plant~~ is not adequately represented by the applicable analytical model provided under clause 5.7.6(h) or clause S5.2.4; and
 - (2) holds the reasonable opinion that the performance of the *plant*, or inadequacy of the applicable analytical model, is impeding or will impede *AEMO's* ability to carry out its role in relation to *power system security*;
- (f1) The direction given under paragraph (f) may require the Schedule 5 Participant to operate the plant at a particular level, pattern or profile of active power or in a particular mode until the Schedule 5 Participant submits evidence reasonably satisfactory to AEMO that the plant is complying with the relevant performance standard and performing substantially in accordance with the applicable analytical model.
- (f2) A Schedule 5 Participant must comply with a direction given by AEMO under paragraph (f).
- (g) Each ~~Generator and Integrated Resource Provider~~ Registered Participant or Schedule 5 Participant must maintain records for 7 years ~~for each of its generating systems, integrated resource systems and power stations~~ setting out details of the results of all technical performance and monitoring conducted on its plant under this clause 5.7.3 and make these records available to *AEMO* on request.

5.8 Commissioning

5.8.1A Application of rule 5.8

In this rule 5.8:

Relevant Schedule 5 Participant means the Schedule 5 Participant for any new or replacement schedule 5.2 plant, schedule 5.3 plant or schedule 5.3a plant that has a nameplate rating greater than or equal to 30 MW or 30 MVA, except to the extent that AEMO determines that this rule 5.8 should not apply to that plant, having regard to the expected effect of the plant on power system security and after consulting with any relevant Network Service Providers.

5.8.2 Co-ordination during commissioning

A *Registered Participant* or a Relevant Schedule 5 Participant seeking to connect to a network must co-operate with the relevant *Network Service Provider(s)* and *AEMO* to develop procedures to ensure that the commissioning of the *connection* and *connected facility* is carried out in a manner that:

- (a) does not adversely affect other *Registered Participants* or Relevant Schedule 5 Participants, or affect *power system security* or quality of supply of the *power system*; and
- (b) minimises the threat of damage to any other *Registered Participant's* or Relevant Schedule 5 Participant's equipment.

5.8.4 Commissioning program

- (a) Prior to the proposed commencement of commissioning by a *Registered Participant* or a Relevant Schedule 5 Participant of any new or replacement equipment that could reasonably be expected to alter performance of the *power system*, the *Registered Participant* must advise the relevant *Network Service Provider* and *AEMO* in writing of the commissioning program including test procedures and proposed test equipment to be used in the commissioning.
- (b) Notice under clause 5.8.4(a) must be given not less than 3 months prior to commencement of commissioning for a *connection* to a *transmission network* and not less than 1 month prior to commencement of commissioning for a *connection* to a *distribution network*.
- (c) The relevant *Network Service Provider* and *AEMO* must, within 15 *business days* of receipt of such advice under clause 5.8.4(a), notify the *Registered Participant* or the Relevant Schedule 5 Participant (as applicable) either that they:
 - (1) agree with the proposed commissioning program; or
 - (2) require changes to it in the interest of maintaining *power system security*, safety or quality of supply.
- (d) If the relevant *Network Service Provider* or *AEMO* require changes to the proposed commissioning program, then the parties must co-operate to reach agreement and finalise the commissioning program within a reasonable period.

- (e) A *Registered Participant* or a Relevant Schedule 5 Participant must not commence the commissioning until the commissioning program has been finalised and the relevant *Network Service Provider* and *AEMO* must not unreasonably delay finalising a commissioning program.

5.8.5 Commissioning tests

- (a) The relevant *Network Service Provider* and/or *AEMO* has the right to witness commissioning tests relating to new or replacement equipment that could reasonably be expected to alter performance of the *power system* or the accurate metering of *energy*.
- (b) The relevant *Network Service Provider* must, within a reasonable period of receiving advice of commissioning tests, notify the *Registered Participant* or the Relevant Schedule 5 Participant whose new or replacement equipment is to be tested under this clause 5.8.5 whether or not it:
 - (1) wishes to witness the commissioning tests; and
 - (2) agrees with the proposed commissioning times.
- (c) A *Registered Participant* or a Relevant Schedule 5 Participant whose new or replacement equipment is tested under this clause 5.8.5 must submit to the relevant *Network Service Provider* the commissioning test results demonstrating that a new or replacement item of equipment complies with the *Rules* or the relevant *connection agreement* or both to the satisfaction of the relevant *Network Service Provider*.

Note

This paragraph is classified as a tier 1 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (d) If the commissioning tests conducted in relation to a new or replacement item of equipment demonstrates non-compliance with one or more requirements of the *Rules* or the relevant *connection agreement* then the *Registered Participant* or the Relevant Schedule 5 Participant whose new or replacement equipment was tested under this clause 5.8.5 must promptly meet with the *Network Service Provider* to agree on a process aimed at achievement of compliance of the relevant item with the *Rules*.
- (e) On request by a *Network Service Provider*, *AEMO* may direct that the commissioning and subsequent *connection* of the *Registered Participant's* or the Relevant Schedule 5 Participant's equipment must not proceed if the relevant equipment does not comply with the requirements described in clause 5.8.1(a).

S5.1a.8 Fault clearance times

- (a) Faults anywhere within the *power system* should be cleared sufficiently rapidly that:
 - (1) the *power system* does not become unstable as a result of faults that are *credible contingency events*;
 - (2) *inter-regional* or *intra-regional power transfers* are not unduly constrained; and

- (3) consequential equipment damage is minimised.
- (b) The *fault clearance time* of a ~~*primary protection system*~~*primary protection system* for a *short circuit fault* of any *fault type* anywhere:
- (1) within a *substation*;
 - (2) within *connected plant*; or
 - (3) on at least the half of a power line nearer to the *protection system*, should not exceed the relevant time in column 2 of Table S5.1a.2 for the *nominal voltage* that applies at the fault location.
- (c) The *fault clearance time* of a ~~*primary protection system*~~*primary protection system* for a *short circuit fault* of any *fault type* anywhere on the remote portion of a power line for which the near portion is protected by a ~~*primary protection system*~~*primary protection system* under clause S5.1a.8(b) should not exceed the relevant time in column 3 of Table S5.1a.2 for the *nominal voltage* that applies at the fault location.
- (d) The *fault clearance time* of a *breaker fail protection system* or similar ~~*back-up protection system*~~*back-up protection system* for a *short circuit fault* of any *fault type* should not exceed the relevant time in column 4 of Table S5.1a.2 for the *nominal voltage* that applies at the fault location.
- (e) The owner of the faulted element may require shorter *fault clearance times* to minimise *plant* damage.
- (f) The allowable *fault clearance times* specified in Table S5.1a.2 apply in accordance with the provisions of clause S5.1.9 to *facilities* constructed or modified on or after the *performance standards commencement date*.
- (g) For *facilities* other than those referred to in clause S5.1a.8(f), the applicable allowable *fault clearance times* must be derived by the relevant *Network Service Provider* from the existing capability of each *facility* on the *performance standards commencement date*.

S5.1.9 Protection systems and fault clearance times

Network Users

- (a) A *Network Service Provider* must determine the *automatic access standard* and *minimum access standard* that applies to the protection zone of each *protection system* in relation to the *connection point* and the *plant* to be connected, as follows:
- (1) The *automatic access standard* for *fault clearance time* for any *fault type* is the lesser of the *system standard* set out in clause S5.1a.8 that applies to the highest *nominal voltage* within the *protection system's* protection zone and the corresponding *minimum access standard* determined under clauses S5.1.9(a)(2) or S5.1.9(a)(3) as applicable.
 - (2) The *minimum access standard* for *fault clearance time* of a ~~*primary protection system*~~*primary protection system* is:
 - (i) for a *fault type* that constitutes a *credible contingency event* in the relevant protection zone, the longest time such that a *short circuit fault* of that *fault type* that is cleared in that time would

not cause the *power system* to become unstable when operating at any level of *inter-regional* or *intra-regional power transfer* that would be permissible (taking into account all other limiting criteria) if the *fault clearance time* for such a fault at the *connection point* were the *system standard* set out in clause S5.1a.8 that applies to the *nominal voltage* at the *connection point*; and

- (ii) for a *fault type* that does not constitute a *credible contingency event* in the relevant protection zone:
 - (A) if a two phase to ground fault in that protection zone constitutes a *credible contingency event*, the corresponding *fault clearance time* for a two phase to ground *short circuit fault* in that protection zone as determined under clause S5.1.9(a)(2)(i); and
 - (B) otherwise, the shortest of the *fault clearance times* for a two phase to ground *short circuit fault* in each adjoining protection zone (excluding *transformer* protection zones and *dead zones*) as determined under clauses S5.1.9(a)(2)(i) or S5.1.9(e).

- (3) The *minimum access standard* for *fault clearance time* of a *breaker fail protection system* or similar ~~*back-up protection system*~~ *back-up protection system* is the longest time such that a *short circuit fault* of any *fault type* that is cleared in that time would not damage any part of the *power system* (other than the faulted element) while the fault current is flowing or being interrupted.

(b) [Deleted]

Transmission systems and distribution systems

- (c) Subject to clauses S5.1.9(k) and S5.1.9(l), a *Network Service Provider* must provide sufficient ~~*primary protection systems*~~ *primary protection systems* and ~~*back-up protection systems*~~ *back-up protection systems* (including *breaker fail protection systems*) to ensure that a fault of any *fault type* anywhere on its *transmission system* or *distribution system* is automatically *disconnected* in accordance with clause S5.1.9(e) or clause S5.1.9(f).
- (d) If the *fault clearance time* determined under clause S5.1.9(e) of a ~~*primary protection system*~~ *primary protection system* for a two phase to ground *short circuit fault* is less than 10 seconds, the ~~*primary protection system*~~ *primary protection system* must have sufficient redundancy to ensure that it can clear *short circuit faults* of any *fault type* within the relevant *fault clearance time* with any single protection element (including any communications facility upon which the *protection system* depends) out of service.
- (e) The *fault clearance time* of a ~~*primary protection system*~~ *primary protection system* of a *Network Service Provider* must not exceed:
 - (1) for any *fault type* that constitutes a *credible contingency event* in the relevant protection zone, the longest time such that a *short circuit fault* of that *fault type* that is cleared in that time would not cause the *power system* to become unstable when operating at any level of *inter-*

regional or intra-regional power transfer that would be permissible (taking into account all other limiting criteria) if the *fault clearance time* for such a fault in that protection zone were the relevant *system standard* set out in clause S5.1a.8; and

- (2) for any *fault type* that does not constitute a *credible contingency event* in the relevant protection zone:
 - (i) if a two phase to ground fault in that protection zone is a *credible contingency event*, the corresponding *fault clearance time* for a two phase to ground fault in that protection zone as determined under clause S5.1.9(e)(1); and
 - (ii) otherwise, the shortest of the *fault clearance times* for a two phase to ground fault in each adjoining protection zone (excluding *transformer* protection zones and dead zones) as determined under clauses S5.1.9(a)(2)(i), S5.1.9(e)(1) or S5.1.9(e)(2)(i).
- (f) The *fault clearance time* of each *breaker fail protection system* or similar ~~*back-up protection system*~~ of a *Network Service Provider* must be such that a *short circuit fault* of any *fault type* that is cleared in that time would not damage any part of the *power system* (other than the faulted element) while the fault current is flowing or being interrupted.
- (g) A *Network Service Provider* must demonstrate to *AEMO* that each *fault clearance time* for a ~~*primary protection system*~~ that is longer than the relevant *system standard* set out in clause S5.1a.8 and is less than 10 seconds would not cause or require an *inter-regional* or *intra-regional power transfer capability* to be reduced.
- (h) A *Network Service Provider* must include in each *connection agreement* entered into after the *performance standards commencement date*:
 - (1) the *fault clearance times* for each *fault type* of each of its *protection systems* that could reasonably be expected to interrupt *supply* to or from the relevant *connection point*; and
 - (2) an agreement to not increase those *fault clearance times* without the prior written agreement of the other party.
- (i) *Network Service Providers* must coordinate and cooperate with *Network Users* to implement *breaker fail* protection for circuit breakers provided to isolate the *Network User's facility* from the *Network Service Provider's facilities*.
- (j) Where practicable and economic to achieve, investments should meet the *system standard* for *fault clearance times* as specified in clause S5.1a.8 for two phase to ground *short circuit faults*.
- (k) A ~~*primary protection system*~~ may clear faults other than *short circuit faults* slower than the relevant *fault clearance time*, provided that such faults would be cleared sufficiently promptly to not adversely impact on *power system security* compared with its operation for the corresponding *short circuit fault*. In the case of a fault within equipment

at a station, the corresponding *short circuit fault* is to be taken as a two phase to ground *short circuit fault* at the external connections of the equipment.

- (l) *Protection systems* may rely on *breaker fail protection systems* or other ~~*back-up protection systems*~~*back-up protection systems* to completely clear faults of any *fault type* that:
- (1) occur within a *substation* between a protection zone and a circuit breaker adjacent to that protection zone that is required to open to clear the fault (a **dead zone**); and
 - (2) remain connected through a power line or *transformer* after operation of a ~~*primary protection system*~~*primary protection system*,
- provided that the relevant *Network Service Provider* assesses that the likelihood of a fault occurring within the dead zone is not greater than the likelihood of a fault occurring on *busbars*.
- (m) For the purposes of this clause S5.1.9, a *credible contingency event* includes any event that clause S5.1.2.1 requires a *Network Service Provider* to consider as a *credible contingency event*.
- (n) The provisions of clause S5.1.9(d) apply to *facilities* constructed or modified on or after the *performance standards commencement date*.
- (o) For *facilities* other than those referred to in clause S5.1.9(n), the requirement for ~~*primary protection system*~~*primary protection system* redundancy must be derived by the *Network Service Provider* from the existing capability of each *facility* on the *performance standards commencement date*.

Schedule 5.2 Technical connection requirements for generating systems, integrated resource systems and synchronous condensers

S5.2.4 Provision of information

- (a) A *Schedule 5.2 Participant* must promptly on request by *AEMO* or the *Network Service Provider* provide all data in relation to its *schedule 5.2 plant* specified in schedule 5.5.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b) A *Schedule 5.2 Participant* in respect of a:
- (1A) *production system* having *production units* with a combined *nameplate rating* of 30 MW or more; or
 - (1B) *synchronous condenser system* having *synchronous condensers* with a combined *nameplate rating* of 30 MVA or more,
- by the earlier of:

- (1) the day on which an *application to connect* is made under clause 5.3.4(a);
- (2) the day on which amendments to *performance standards* are submitted under rule 4.14(p) or clause 5.3.9(b);
- (3) three months before commissioning of the *schedule 5.2 plant* or planned alteration to the *schedule 5.2 plant*; or
- (4) *5 business days* before commissioning of an alteration to the *schedule 5.2 plant* that is repairing *plant* after a *plant* failure, if *plant* performance after the alteration will differ from performance prior to the *plant* failure,

must provide:

- (5) to *AEMO* and the relevant *Network Service Provider(s)* (including the relevant *Transmission Network Service Provider* in respect of a *distribution connected unit*):
 - (i) information about the *protection systems* of the *schedule 5.2 plant*;
 - (ii) information about the *control systems* of the *schedule 5.2 plant* including:
 - (A) a set of functional block diagrams, including all functions between feedback signals and *generating system* output or *integrated resource system* output or consumption;
 - (B) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits;
 - (C) the characteristics of non-linear elements;
 - (D) encrypted models in a form suitable for the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*;
- (6) to *AEMO*, the model source code (in the circumstances required by the *Power System Model Guidelines*) associated with the *power system* simulation model in subparagraph (ii)(D) in an unencrypted form suitable for at least one of the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*, and in a form that would allow conversion for use with other software products nominated by *AEMO* in the *Power System Model Guidelines*;
- (7) **[Deleted]**
- (7A) to *AEMO* and the relevant *Network Service Provider(s)*, any other information specified in the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*; and
- (8) to *AEMO* and the relevant *Network Service Providers* (including the relevant *Transmission Network Service Provider* in respect of a *distribution connected unit*) a *releasable user guide*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (b1) The information provided under paragraph (b) must contain sufficient detail for *AEMO* and the relevant *Network Service Provider(s)* to perform *power system* simulation studies in accordance with the requirements and circumstances specified in the *Power System Model Guidelines*.
- (c) The information provided under paragraph (b) must:
 - (1) encompass all *control systems* that respond to voltage or *frequency* disturbances on the *power system*, and which are either integral to the *production units* or otherwise part of the *schedule 5.2 plant*, including those applying to *reactive power* equipment that forms part of the *schedule 5.2 plant*;
 - (2) conform with the applicable models developed in accordance with the *Power System Model Guidelines*, or an alternative model agreed with *AEMO* to be necessary to adequately represent the relevant *plant* to carry out load flow and dynamic simulations and (where applicable) specialised *power system* studies; and
 - (3) reflect the *control system* tuning consistent with the range of:
 - (i) *three phase fault levels*; and
 - (ii) system impedance values,
specified by the *Network Service Provider* for the *connection point* consistent with clause S5.2.5.13, and the *releasable user guide* must record the relevant levels used for tuning, including the X/R ratio of the *power system* observed from the *connection point*.
- (d) The *Schedule 5.2 Participant* must provide to *AEMO* information that updates the information provided under paragraph (b) and must provide to the relevant *Network Service Providers* information that updates the information provided under subparagraph (b)(5):
 - (1) within 3 months after commissioning tests or other tests undertaken in accordance with clause 5.7.3 are completed;
 - (2) when the *Schedule 5.2 Participant* becomes aware that the information is incomplete, inaccurate or out of date; or
 - (3) on request by *AEMO* or the relevant *Network Service Provider*, where *AEMO* or the relevant *Network Service Provider* considers that the information is incomplete, inaccurate or out of date.
- (d1) A *Schedule 5.2 Participant* is only required to provide new information under clause S5.2.4(d) to the extent that it is different to the information previously provided under clause S5.2.4(b).
- (e) For the purposes of clause S5.2.4(e1), a *Connection Applicant* must either:
 - (1) be registered as an *Intending Participant* in accordance with rule 2.7;
or

- (2) if neither required nor intending to register in respect of the relevant *schedule 5.2 plant*, comply with rule 8.6 as if the *Connection Applicant* were a *Registered Participant* and, if required by the *Network Service Provider*, give an undertaking to that effect in a form satisfactory to the *Network Service Provider* as a condition of providing the technical information.
- (e1) For the purposes of clause 5.3.2(f), the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of a proposed *connection* for a *schedule 5.2 plant* includes:
- (1) the highest and lowest expected single phase fault level and *three phase fault level* at the *connection point* and the X/R ratio, with the *schedule 5.2 plant* not electrically connected;
- (1A) the mid-point voltage for the purposes of clause S5.2.5.1;
- (1B) the highest and typical expected system impedances at the *connection point* with the *schedule 5.2 plant* not electrically connected, as required for the purposes of clause S5.2.5.13;
- (1BA) a list, to be prepared in consultation with AEMO, of non-credible contingency events that are likely to be reclassified as credible contingency events under clause 4.2.3A in reasonably anticipated abnormal conditions, and are likely to cause a significant disturbance at the schedule 5.2 plant's connection point;
- (1C) any other matters that *AEMO* or the *Network Service Provider* may specify, nominate or require for the purposes of any *access standard* in this schedule 5.2;
- (2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;
- (3) the expected limits of voltage fluctuation, harmonic voltage distortion and voltage unbalance at the *connection point* with the *schedule 5.2 plant* not electrically connected;
- (4) technical information relevant to the *connection point* with the *schedule 5.2 plant* not electrically connected including equivalent source impedance information, sufficient to estimate fault levels, voltage fluctuations, harmonic voltage distortion (for harmonics relevant to the *generating system*) and voltage unbalance;
- (5) other information relating to the performance of the *national grid* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*, including:
- (i) a model of the *power system*, including relevant *considered projects* and the range of expected operating conditions, sufficient to carry out load flow and dynamic simulations; and
- (ii) information on *inter-regional* and *intra-regional power transfer capabilities* and relevant *plant ratings*; and

- (6) the *Network Service Provider's* expected *three phase fault level* at the *connection point* for the *schedule 5.2 plant* following the *connection* of the *schedule 5.2 plant*.
- (f) All information provided under this clause S5.2.4 must be treated as *confidential information*. A *Schedule 5.2 Participant* who receives information under this clause and is not a *Registered Participant* must comply with rule 8.6 as if it were a *Registered Participant*.

S5.2.5.5 Disturbance ride-through capability

~~and~~

- (a) In this clause S5.2.5.5:
 - (1) a disturbance is taken to end when the voltage at the *connection point* recovers to within 90% to 110% of *nominal voltage* and remains within that range for at least 20 milliseconds; and
 - (2) references to voltage have the same meaning as in clause S5.2.5.4(a0)(3).

Automatic access standard

- (b) The *automatic access standard* is the requirements of paragraphs (c) and (d).
- (c) A *schedule 5.2 plant* and each of its operating *production units* and *synchronous condensers* must remain in *continuous uninterrupted operation* for any disturbance caused by:
 - (1) a *credible contingency event*, subject to paragraph (u);
 - (2) a three phase fault in a *transmission system* cleared by all relevant *primary protection systems*~~*primary protection systems*~~;
 - (3) a two phase to ground, phase to phase or phase to ground fault in a *transmission system* cleared in:
 - (i) the longest time expected to be taken for a relevant *breaker fail protection system* to clear the fault; or
 - (ii) if a *protection system* referred to in subparagraph (i) is not installed, the greater of the time specified in column 4 of Table S5.1a.2 (or if none is specified, 430 milliseconds) and the longest time expected to be taken for all relevant *primary protection systems*~~*primary protection systems*~~ to clear the fault; or
 - (4) a three phase, two phase to ground, phase to phase or phase to ground fault in a *distribution network* cleared in:
 - (i) the longest time expected to be taken for the *breaker fail protection system* to clear the fault; or
 - (ii) if a *protection system* referred to in subparagraph (i) is not installed, the greater of 430 milliseconds and the longest time expected to be taken for all relevant *primary protection systems*~~*primary protection systems*~~ to clear the fault,

provided that the event is not one that would *disconnect* the *plant* from the *power system* by removing *network elements* from service.

- (d) A *schedule 5.2 plant* and each of its operating *production units* and *synchronous condensers* must remain in *continuous uninterrupted operation* for a series of up to 15 disturbances within any five minute period caused by any combination of the events described in paragraph (c) where:
- (1) up to six of the disturbances cause the voltage at the *connection point* to drop below 50% of *nominal voltage*;
 - (2) in parts of the *network* where three-phase automatic reclosure is permitted, up to two of the disturbances are three phase faults, and otherwise, up to one three phase fault where voltage at the *connection point* drops below 50% of *nominal voltage*;
 - (3) up to one disturbance is cleared by a *breaker fail protection system* or similar ~~*back-up protection system*~~ *back-up protection system*;
 - (4) up to one disturbance causes the voltage at the *connection point* to vary within the ranges under clause S5.2.5.4(a)(7) and (a)(8);
 - (5) the minimum time difference between the end of one disturbance and the commencement of the next disturbance may be zero milliseconds; and
 - (6) all remaining disturbances are caused by faults other than three phase faults,

provided that none of the events would result in:

- (7) the islanding of the *plant* or cause a material reduction in *power transfer capability* by removing *network elements* from service;
 - (8) the cumulative time that voltage at the *connection point* is lower than 90% of *nominal voltage* exceeding 1,800 milliseconds within any five minute period;
 - (9) the time integral, within any five minute period, of the difference between 90% of *nominal voltage* and the voltage at the *connection point* when the voltage at the *connection point* is lower than 90% of *nominal voltage* exceeding 1 pu second; or
 - (10) the system impedance at the *connection point* being above the highest system impedance for which the *plant* must be tuned, as nominated by the *Network Service Provider* under clause S5.2.5.13(m).
- (e) **[Deleted]**
- (f) **[Deleted]**
- (g) **[Deleted]**
- (h) **[Deleted]**
- (i) **[Deleted]**

Minimum access standard

- (j) The *minimum access standard* is the requirements of paragraphs (k) and (l).

(k) A *schedule 5.2 plant* and each of its operating *production units* and *synchronous condensers* must remain in *continuous uninterrupted operation* for any disturbance caused by:

- (1) a *credible contingency event*, subject to paragraph (u); or
- (2) a single phase to ground, phase to phase or two phase to ground fault in a *transmission system* or *distribution network* cleared in the longest time expected to be taken for all relevant *primary protections systems*~~*primary protection systems*~~ to clear the fault, unless *AEMO* and the *Network Service Provider* agree that the total impact on the *power system* due to that fault would not exceed 100 MW, or a greater limit based on what *AEMO* and the *Network Service Provider* both consider to be reasonable in the circumstances,

provided that the event is not one that would disconnect the *plant* from the *power system* by removing *network elements* from service.

(l) A *schedule 5.2 plant* and each of its operating *production units* and *synchronous condensers* must remain in *continuous uninterrupted operation* for a series of up to six disturbances within any five minute period caused by any combination of the events described in paragraph (k) where:

- (1) up to three of the disturbances cause the voltage at the *connection point* to drop below 50% of *nominal voltage*;
- (2) up to one disturbance causes the voltage at the *connection point* to vary within the ranges agreed by *AEMO* and the *Network Service Provider* under clauses S5.2.5.4(a)(7), (a)(8), (b)(4) or (b)(5) (as appropriate);
- (3) the time difference between the end of one disturbance and the commencement of the next disturbance exceeds 200 milliseconds;
- (4) no more than three of the disturbances occur within 30 seconds; and
- (5) all disturbances are caused by faults other than three phase faults,

provided that none of the events would result in:

- (6) the islanding of the *plant* or cause a material reduction in *power transfer capability* by removing *network elements* from service;
- (7) the cumulative time that voltage at the *connection point* is lower than 90% of *nominal voltage* exceeding 1,000 milliseconds within any five minute period;
- (8) the time integral, within any five minute period, of the difference between 90% of *nominal voltage* and the voltage at the *connection point* when the voltage at the *connection point* is lower than 90% of *nominal voltage* exceeding 0.5 pu second;
- (9) the system impedance at the *connection point* being above the highest system impedance for which the *plant* must be tuned, as nominated by the *Network Service Provider* under clause S5.2.5.13(m); or
- (10) a condition specified in the *performance standards* in accordance with paragraph (r2),

and there is a minimum of 30 minutes where no disturbances occur following a five minute period of multiple disturbances.

- (m) **[Deleted]**
- (n) **[Deleted]**
- (o) **[Deleted]**
- (o1) **[Deleted]**
- (p) **[Deleted]**
- (p1) **[Deleted]**
- (p2) **[Deleted]**
- (p3) **[Deleted]**

Negotiated access standard

- (q) In carrying out assessments of proposed *negotiated access standards* under this clause S5.2.5.5, the *Network Service Provider* and *AEMO* must take into account, without limitation:
 - (1) the expected performance of:
 - (i) existing *networks* and *considered projects*;
 - (ii) existing *generating plant* and other relevant projects; and
 - (iii) *control systems* and *protection systems*, including auxiliary systems and *automatic reclose equipment*; and
 - (2) the expected range of *power system* operating conditions.
- (r) A proposed *negotiated access standard* may be accepted if the *connection* of the *plant* at the proposed access level would not cause other *plant* to trip as a result of an event, when they would otherwise not have tripped for the same event.
- (r1) In assessing proposed *negotiated access standards* under this clause S5.2.5.5 where the *Schedule 5.2 Participant* has elected in accordance with clause 5.3.4B(b1) to pay the *system strength charge* in relation to the *connection*, the *Network Service Provider* and *AEMO* must take into account the performance required to be provided by the *System Strength Service Provider* at the relevant *system strength node* in accordance with clause S5.1.14.
- (r2) A *negotiated access standard* may include:
 - (1) a specified *plant* limitation in respect of which the *Network Service Provider* and *AEMO* agree that the *schedule 5.2 plant* is not required to remain in *continuous uninterrupted operation* for a specified combination of *power system* disturbances or associated conditions; and
 - (2) the required response of the *schedule 5.2 plant* for each combination of *power system* disturbances or associated conditions specified under sub-paragraph (1), which should be as close to *continuous uninterrupted operation* as is reasonably practicable,

provided that any agreed *plant* limitations must not reduce the overall number of disturbances in a given period for which the *schedule 5.2 plant* is required to remain in *continuous uninterrupted operation* below the level specified in clause S5.2.5.5(l).

General requirements

- (s) The *performance standard* must include any operational arrangements to ensure the *schedule 5.2 plant* and all operating *bidirectional units* will meet its agreed performance levels under abnormal *network* or *plant* conditions or *abnormal conditions*.
- (t) When assessing multiple disturbances, a fault that is re-established following operation of *automatic reclose equipment* shall be counted as a separate disturbance.
- (u) ~~[Deleted]~~ A *credible contingency event* includes:
 - (1) for the purposes of both paragraphs (c) and (k), all *credible contingency events* used by the *Network Service Provider* for the purposes of clause S5.1.2.1; and
 - (2) for the purposes of paragraph (c) only, *non-credible contingency events* that are likely to be reclassified as *credible contingency events* under clause 4.2.3A, which have been identified by the *Network Service Provider* under subparagraph S5.2.4(e1)(1BA).
- (v) ~~[Deleted]~~
- (w) ~~[Deleted]~~

S5.2.5.9 Protection systems that impact on power system security

Automatic access standard

- (a) The *automatic access standard* is:
 - (1) subject to clauses S5.1.9(k) and S5.1.9(l), *primary protection systems*~~*primary protection systems*~~ must be provided to *disconnect* from the *power system* any faulted element in a *schedule 5.2 plant* and in protection zones that include the *connection point* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1);
 - (2) each *primary protection system*~~*primary protection system*~~ must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications *facility* upon which that *protection system* depends) out of service; and
 - (3) *breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the *primary protection system*~~*primary protection system*~~ within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).
- (b) In relation to an *automatic access standard* under this clause S5.2.5.9, the *Schedule 5.2 Participant* must provide redundancy in the *primary protection systems*~~*primary protection systems*~~ under paragraph (a)(2) and provide

breaker fail protection systems under paragraph (a)(3) if *AEMO* or the *Network Service Provider* consider that a lack of these *facilities* could result in:

- (1) a material adverse impact on *power system security* or quality of *supply* to other *Network Users*; or
- (2) a reduction in *inter-regional* or *intra-regional power transfer capability*,

through any mechanism including:

- (3) consequential tripping of, or damage to, other *network equipment* or *facilities* of other *Network Users*, that would have a *power system security* impact; or
- (4) instability that would not be detected by other *protection systems* in the *network*.

Minimum access standard

(c) The *minimum access standard* is:

- (1) subject to clauses S5.1.9(k) and S5.1.9(l), *protection systems* must be provided to *disconnect* from the *power system* any faulted element within a *schedule 5.2 plant* and in protection zones that include the *connection point* within the applicable *fault clearance time* determined under clause S5.1.9(a)(2); and
- (2) if a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the ~~*primary protection system*~~*primary protection system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

[Deleted]

(d) **[Deleted]**

General requirements

(e) The *Network Service Provider* and the *Schedule 5.2 Participant* must cooperate in the design and implementation of *protection systems* to comply with this clause S5.2.5.9, including cooperation on:

- (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;
- (2) tripping of one party's circuit breakers by a *protection system* of the other party; and
- (3) co-ordination of *protection system* settings to ensure inter-operation.

(f) The *protection system* design referred to in paragraphs (a) and (c) must:

- (1) be coordinated with other *protection systems*;

- (2) avoid consequential *disconnection* of other *Network Users' facilities*;
and
- (3) take into account existing obligations of the *Network Service Provider* under *connection agreements* with other *Network Users*.

S5.2.5.15 Short circuit ratio

- (a) This clause S5.2.5.15 applies only to *asynchronous production units*, and to a *production system* only to the extent of its *asynchronous production units* (if any).

Minimum access standard

- (b) The *minimum access standard* is a *production system* must have *plant* capability sufficient for its *asynchronous production units* to operate stably and remain *connected* at a *short circuit ratio* of 3.0, assessed in accordance with the methodology prescribed in the *system strength impact assessment guidelines*, and subject to paragraph (e).

General requirements

- (c) The *performance standards* must record:
 - (1) the agreed value of the *short circuit ratio* which must be the minimum of 3.0 and the value at which the *production system* has, subject to paragraph (e), *plant* capability sufficient to operate stably and remain *connected*;
 - (2) the *active power capability* or *maximum demand* (whichever is greater), used to calculate the value of the *short circuit ratio*; and
 - (3) any arrangements agreed under paragraph (e).
- (d) The *plant* capability referred to in paragraph (c)(1) may be demonstrated with any appropriate *control system* and/or *protection system* settings. The settings used may be different to the setting required for compliance with other *performance standards* established under this clause S5.2.5.
- (e) If the *production system* is not otherwise capable of meeting the *minimum access standard*, the *Schedule 5.2 Participant* may, if agreed by *AEMO*, the *Network Service Provider* and the *System Strength Service Provider*, achieve compliance by demonstrating it has:
 - (1) in accordance with paragraph (f), legally binding commitments to make additional investment in its *plant* or for the supply to it of services to remedy, at its cost, the shortfall in capability, either on *connection* or in agreed circumstances (such as the occurrence of an event that results in a change to the *three phase fault level* at the *connection point*); together with
 - (2) operational arrangements agreed with the *Network Service Provider* that apply when the investment or services referred to in subparagraph (1) have not yet been made or are not available.
- (f) For paragraph (e)(1), the *Schedule 5.2 Participant* may:
 - (1) reach agreement with the *Network Service Provider* for the *Schedule 5.2 Participant* to undertake investment in its *plant* to achieve *plant*

capability sufficient to operate stably and remain *connected* at a *short circuit ratio* of 3.0; or

- (2) procure from the *Network Service Provider*, the *System Strength Service Provider* or another *Registered Participant*, services to enable the *generating system* or *integrated resource system* to operate stably and remain *connected* at a *short circuit ratio* of 3.0 but calculated using a *three phase fault level* at the *connection point* that excludes any contribution from the *facilities* providing the service.

Schedule 5.3 Technical connection requirements for loads

S5.3.1 Information

- (a) Before a *Schedule 5.3 Participant* connects any new or additional equipment to a *network*, the *Schedule 5.3 Participant* must submit the following kinds of information to the *Network Service Provider*:
 - (1) a single line diagram with the protection details;
 - (2) *metering system* design details for any metering equipment being provided by the *Schedule 5.3 Participant*;
 - (3) a general arrangement locating all the equipment on the site;
 - (4) a general arrangement for each new or altered *substation* showing all exits and the position of all electrical equipment;
 - (5) type test certificates for all new switchgear and *transformers*, including measurement *transformers* to be used for metering purposes in accordance with Chapter 7 of the *Rules*;
 - (6) earthing details;
 - (7) the proposed methods of earthing cables and other equipment to comply with the regulations of the relevant *participating jurisdiction*;
 - (8) *plant* and earth grid test certificates from approved test authorities;
 - (9) a secondary injection and trip test certificate on all circuit breakers;
 - (10) certification that all new equipment has been inspected before being *connected* to the *supply*; and
 - (11) operational arrangements.
- (a1) Before a *Schedule 5.3 Participant* connects any new or additional equipment to a *network* or if earlier, in accordance with the requirements of this Chapter, the *Schedule 5.3 Participant* must submit:
 - (1) to *AEMO* and the relevant *Network Service Provider(s)*, information about the *protection systems* of the equipment;
 - (2) to *AEMO* and the relevant *Network Service Provider(s)*, information about the *control systems* of the equipment including:
 - (i) a set of functional block diagrams, including all functions between feedback signals and output;
 - (ii) the parameters of each functional block, including all settings, gains, time constants, delays, deadbands and limits;

- (iii) the characteristics of non-linear elements;
- (iv) encrypted models in a form suitable for the software simulation products nominated by *AEMO* in the *Power System Model Guidelines*;

(2A) to *AEMO* and the relevant *Network Service Provider(s)*, information about the capability of the equipment to remain *connected* to the *power system* and continue operating during and after one or more *frequency* or *voltage disturbances*, as requested by the relevant *Network Service Provider* following consultation with *AEMO*;

- (3) to *AEMO* and the relevant *Network Service Provider(s)*, any other information specified in the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*;
- (4) to *AEMO*, model source code (in the circumstances required by the *Power System Model Guidelines*) associated with the model in subparagraph (2)(iv) in an unencrypted form suitable for at least one of the software simulation products nominated by *AEMO* in the *Power System Model Guidelines* and in a form that would allow conversion for use with other software simulation products nominated by *AEMO* in the *Power System Model Guidelines*.

Note

This paragraph is classified as a tier 2 civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

- (a2) The information provided under paragraph (a1) must contain sufficient detail for *AEMO* and the relevant *Network Service Provider(s)* to perform *power system* simulation studies in accordance with the requirements and circumstances specified in the *Power System Model Guidelines*.
- (a3) Notwithstanding paragraph (a1), *AEMO* may exempt a *Schedule 5.3 Participant* or class of *Schedule 5.3 Participants* from the requirement to provide some or all of the information specified in paragraph (a1), and must do so in accordance with the circumstances set out in the *Power System Model Guidelines*.
- (a4) All information provided to *AEMO* and the relevant *Network Service Provider(s)* under paragraph (a1) or pursuant to paragraph (a3) must be treated as *confidential information* by those recipients. A *Schedule 5.3 Participant* who receives any *confidential information* under this clause and is not a *Registered Participant* must comply with rule 8.6 as if it were a *Registered Participant*.
- (b) For the purposes of clause 5.3.2(f), the technical information that a *Network Service Provider* must, if requested, provide to a *Connection Applicant* in respect of the proposed *connection* includes:
 - (1) the highest expected single phase and three phase fault levels at the *connection point* without the proposed *connection*;
 - (2) the clearing times of the existing *protection systems* that would clear a fault at the location at which the new *connection* would be connected into the existing *transmission system* or *distribution system*;

- (3) the expected limits of voltage fluctuation, harmonic voltage distortion and voltage unbalance at the *connection point* without the proposed *connection*;
- (4) technical information relevant to the *connection point* without the proposed *connection* including equivalent source impedance information, sufficient to estimate fault levels, voltage fluctuations, harmonic voltage distortion and voltage unbalance; and
- (5) any other information or data not being *confidential information* relating to the performance of the Network Service Provider's *facilities* that is reasonably necessary for the *Connection Applicant* to prepare an *application to connect*;

except where the *Schedule 5.3 Participant* agrees the Network Service Provider may provide alternative or less detailed technical information in satisfaction of this clause S5.3.1(b).

S5.3.1a Application of the schedule

- (a) This schedule sets out details of additional requirements and conditions that a person to whom this schedule applies (described in paragraph (a1)) must satisfy as a condition of *connection* to the *power system* of *plant* that consumes electricity from a *network*, including a *distribution network* or a source of *load* in an *integrated resource system*, but excluding *schedule 5.2 plant* and *schedule 5.3a plant* (“*schedule 5.3 plant*”).
- (a1) This schedule applies in the following way to a person (“*Schedule 5.3 Participant*”) in respect of *schedule 5.3 plant* if that person is the *Connection Applicant* or the party to a connection agreement with the *Network Service Provider* in respect of the *schedule 5.3 plant* ~~one of the following~~:
 - (1) this schedule applies in its entirety if the *Schedule 5.3 Participant* the *Connection Applicant* or the party to a connection agreement with the *Network Service Provider* in respect of a *schedule 5.3 plant*, who:
 - (i) is or intends to be the *Registered Participant* for that *plant*;
 - (ii) has appointed or intends to appoint an *intermediary* for that *plant*; or
 - (iii) has *connected* or intends to *connect* that *plant* to a *transmission network*; or
 - (2) where paragraph (1) does not apply the *Connection Applicant* or the party to a connection agreement with the *Network Service Provider* in respect of a *schedule 5.3 plant* other than a person referred to in paragraph (1), but only to the extent that the *Network Service Provider* considers that the *connection* or operation of the *schedule 5.3 plant* would otherwise adversely affect the quality or security of *network service* to other *Network Users*;
 - (i) if the *schedule 5.3 plant* is a large inverter based load with a nameplate rating of 100MW or greater (**Tier 3 connection**), this schedule applies in its entirety;

- (ii) if the *schedule 5.3 plant* is a *large inverter based load* with a *nameplate rating* of at least 30MW but less than 100MW (**Tier 2 connection**):
- (A) clauses S5.3.11, S5.3.12, S5.3.13 and S5.3.14 only apply to the *Schedule 5.3 Participant* in respect of *schedule 5.3 plant* that includes any *inverter based resource* to the extent that the *Network Service Provider* considers appropriate, having regard to the expected impact of the *connection* on the quality and security of *network services* to other *Network Users*;
- (B) this schedule otherwise only applies to the *Schedule 5.3 Participant* to the extent that the *Network Service Provider* considers that the *connection* or operation of the *schedule 5.3 plant* would otherwise adversely affect the quality and security of *network services* to other *Network Users*.
- (iii) for all other connections of *schedule 5.3 plant* to which paragraphs (i) and (ii) do not apply (**Tier 1 connection**):
- (A) clauses S5.3.11 and S5.3.14 do not apply;
- (B) clauses S5.3.12 and S5.3.13 only apply to the *Schedule 5.3 Participant* in respect of *schedule 5.3 plant* that includes any *inverter based resource* to the extent that the *Network Service Provider* considers appropriate, having regard to the expected aggregate impact of all Tier 1 connections on its *network* on the quality and security of *network services* to other *Network Users*; and
- (C) this schedule otherwise only applies to the *Schedule 5.3 Participant* to the extent that the *Network Service Provider* considers that the *connection* or operation of the *schedule 5.3 plant* would otherwise adversely affect the quality and security of *network services* to other *Network Users*.
- (b) For the purposes of this schedule 5.3, the term *Network Service Provider* ~~*Network Service Provider*~~ means the *Network Service Provider* with whom the *Connection Applicant* has sought, or is seeking, a *connection*.
- (c) **[Deleted]**
- (d) The ~~*Network Service Provider*~~ *Network Service Provider* must include as terms and conditions of the *connection agreement* with a *Schedule 5.3 Participant*, as applicable to its *schedule 5.3 plant*:
- (1) the relevant provisions of this schedule expressed as obligations on a *Schedule 5.3 Participant*; and
 - (2) the relevant agreed *performance standards* with which the *Schedule 5.3 Participant* must comply.
- (e) **[Deleted]**

- (f) This schedule does not apply to a *Network Service Provider* or a *Network User* in relation to a *connection* to a *regulated SAPS*.

S5.3.3 Protection systems and settings

A *Schedule 5.3. Participant* must ensure that all *connections* to the *network* are protected by protection devices which effectively and safely *disconnect* any faulty circuit automatically within a time period specified by the *Network Service Provider* in accordance with the following provisions:

Automatic access standard

- (a) The *automatic access standard* is:
- (1) ~~*Primary protection systems*~~*Primary protection systems* must be provided to *disconnect* any faulted element from the *power system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l).
 - (2) Each ~~*primary protection system*~~*primary protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service.
 - (3) *Breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the ~~*primary protection system*~~*primary protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).

Minimum access standard

- (b) The *minimum access standard* is:
- (1) ~~*Primary protection systems*~~*Primary protection systems* must be provided to *disconnect* from the *power system* any faulted element within their respective protection zones within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l).

- (2) If a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the ~~*primary protection system*~~ *primary protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

General requirements

- (c) The ~~*Network Service Provider*~~ *Network Service Provider* and the *Schedule 5.3 Participant* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:
- (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;
 - (2) tripping of one party's circuit breakers by a *protection system* of the other party; and
 - (3) co-ordination of *protection system* settings to ensure inter-operation.
- (d) Before the *schedule 5.3 plant* is connected to the *Network Service Provider's* transmission system or distribution system its *protection system* must be tested and the *Schedule 5.3 Participant* must submit the appropriate test certificate to the *Network Service Provider*.
- (e) The application of settings of the *protection system* ~~*protection scheme*~~ must be undertaken in accordance with clause S5.3.4.
- (f) For an *inverter based load*, vector shift protection or similar protective functions must not operate for phase shifts less than 20 degrees.
- (g) For an *inverter based load*, *protection systems* must not operate based solely on the number of faults or disturbances that occur during a period of time.

S5.3.10 Load shedding facilities

- (a) This clause S5.3.10 applies to *Schedule 5.3 Participants* who have expected peak demands in excess of 10MW.

Automatic access standard

- (b) The *automatic access standard* is a *schedule 5 plant* must provide automatic *interruptible load* in accordance with clause 4.3.5 of the *Rules* which must be capable of:
- (1) being *disconnected*; and
 - (2) fast reduction of *active power consumption*.

Minimum access standard

- (c) The *minimum access standard* is a *schedule 5.3 plant* must provide *automatic interruptible load* in accordance with clause 4.3.5 of the *Rules*, which must be capable of being *disconnected*.

General requirements

- (d) The performance standards must record the nature of the load shedding capability provided as interruptible load under this clause S5.3.10, including any quantities of active power available for fast reduction and the corresponding rates of reduction.
- (e) Load shedding procedures may be applied by AEMO, or EFCS settings schedules may be determined, in accordance with the provisions of clause 4.3.2 of the Rules for the shedding of all loads including sensitive loads.

S5.3.11 Short circuit ratio

- (a) This clause S5.3.11 applies only to *schedule 5.3 plant* that includes any inverter based ~~load resource~~.

Minimum access standard

- (b) The *minimum access standard* is electrical plant must have plant capability sufficient to operate stably and remain *connected* at a *short circuit ratio* of 3.0, or a reasonable higher value agreed with the Network Service Provider and AEMO having regard to expected three phase fault levels at the connection point, assessed in accordance with the methodology prescribed in the *system strength impact assessment guidelines*.

General requirements

- (c) The *performance standards* must record:
- (1) the agreed value of the *short circuit ratio* which must be the ~~minimum of 3.0~~ lower of the value determined under paragraph (b) and the value at which the *plant* has plant capability sufficient to operate stably and remain *connected*; and
 - (2) the *maximum demand* used to calculate the agreed value.
- (d) For paragraphs (b) and (c), the *plant* capability may be demonstrated with any appropriate *control system* and/or *protection system* settings. The settings used may be different to the setting required for compliance with other *performance standards* established under this schedule.

S5.3.12 Response to frequency disturbances

- (a) This clause S5.3.12 applies to schedule 5.3 plant only to the extent that it includes inverter based load and only in respect of that inverter based load.
- (b) In this clause S5.3.12:
- (1) normal operating frequency band, operational frequency tolerance band, or extreme frequency excursion tolerance limits refer to the widest range specified for those terms for any condition (including an "island" condition) in the frequency operating standards that apply to the region in which the schedule 5.3 plant is located; and
 - (2) stabilisation time and recovery time refer to the longest times allowable for the frequency of the power system to remain outside the operational frequency tolerance band and the normal operating frequency band, respectively, for any condition (including an "island"

condition) in the frequency operating standards that apply to the region in which the schedule 5.3 plant is located.

Automatic access standard

(c) The automatic access standard is a schedule 5.3 plant must not disconnect from the power system for frequencies in the following ranges:

- (1) the lower bound of the extreme frequency excursion tolerance limits to the lower bound of the operational frequency tolerance band for at least the stabilisation time;
- (2) the lower bound of the operational frequency tolerance band to the lower bound of the normal operating frequency band, for at least the recovery time including any time spent in the range under subparagraph (1);
- (3) the normal operating frequency band for an indefinite period;
- (4) the upper bound of the normal operating frequency band to the upper bound of the operational frequency tolerance band, for at least the recovery time including any time spent in the range under subparagraph (5); and
- (5) the upper bound of the operational frequency tolerance band to the upper bound of the extreme frequency excursion tolerance limits for at least the stabilisation time,

unless the rate of change of frequency is outside the range of -4 Hz to 4 Hz per second for more than 0.25 seconds, -3 Hz to 3 Hz per second for more than one second, or such other range as determined by the Reliability Panel from time to time.

Note:

The automatic access standard is illustrated in the following diagram. To the extent of any inconsistency between the diagram and paragraph (c), paragraph (c) prevails.

INSERT IMAGE ACCESS IMAGE HERE

Negotiated access standard

(d) A proposed negotiated access standard may be accepted if AEMO and the Network Service Provider consider that tripping of part or all of the schedule 5.3 plant in accordance with the negotiated access standard is unlikely to result in a power system frequency outside the limits of the operational frequency tolerance band.

Note

This assessment may consider the effects of tripping of the schedule 5.3 plant itself and consequential tripping of other equipment due to under-frequency, over-frequency, rate of change of frequency, three phase fault levels or other resulting power system conditions.

S5.3.13 Response to voltage disturbances

(a) This clause S5.3.13 applies to schedule 5.3 plant only to the extent that it includes inverter based load and only in respect of that inverted based load.

(b) In this clause S5.3.13:

- (1) **rated current** means the largest continuous current that a *schedule 5.3 plant* is designed to consume at the *connection point* as may be specified in the *Power System Design Data Sheet*;
- (2) references to **voltage** are to root mean square *power system frequency voltage* at the *connection point* measured as either phase to phase or phase to ground, expressed as a percentage of the *nominal voltage* or its phase to neutral equivalent, as relevant to the disturbance;
- (3) **voltage disturbance** refers to a variation in voltage outside the range of between 90% and 110% of *nominal voltage*, where:
 - (i) **T(start)** refers to the start of a voltage disturbance, being the point in time when the voltage first varies above 110% of nominal voltage or below 90% of nominal voltage; and
 - (ii) **T(end)** refers to the end of a voltage disturbance, being the point in time when the voltage initially recovers to between 90% and 110% of *nominal voltage*, provided the voltage then remains within that range for at least 20 milliseconds;
 - (iii) the **duration** of a voltage disturbance is the time between T(start) and T(end);
 - (iv) the **overvoltage percentage** is the difference between the voltage and the *nominal voltage*, expressed as a percentage of the nominal voltage; and
 - (v) the **undervoltage percentage** is the difference between the *nominal voltage* and the voltage, expressed as a percentage of the nominal voltage.

Automatic access standard

- (c) The automatic access standard is, subject to paragraph (e), a schedule 5.3 plant must respond in the following manner where a power system disturbance external to the plant causes the voltage on one or more phases at the connection point to vary within the following ranges:
 - (1) where the voltage is over 110% up to and including 130% of nominal voltage:
 - (i) during the voltage disturbance, the schedule 5.3 plant must not disconnect from the rest of the power system for at least the specified duration set out in paragraph (d);
 - (ii) during the voltage disturbance, the schedule 5.3 plant's active power consumption must not increase or decrease by more than the overvoltage percentage, relative to its pre-voltage disturbance active power, for at least the specified duration set out in paragraph (d); and
 - (iii) where the duration of the voltage disturbance is equal to or less than the specified duration set out in paragraph (d), the schedule 5.3 plant's active power consumption must return to between 90% and 110% of its pre-voltage disturbance active power within 500 milliseconds after T(end);

- (2) where the voltage is between 90% and 110% of *nominal voltage*, during the disturbance:
- (i) the *schedule 5.3 plant* must not *disconnect*; and
 - (ii) the *schedule 5.3 plant's*:
 - (A) *active power* consumption must not increase or decrease by more than 10%, relative to its pre-disturbance *active power*; and
 - (B) current must not increase from its pre-disturbance current by more than 20% of its rated current;
- (3) where the voltage is below 90% down to and including 70% of *nominal voltage*:
- (i) during the voltage disturbance, the *schedule 5.3 plant* must not *disconnect* for at least the specified duration set out in paragraph (d);
 - (ii) during the voltage disturbance, the *schedule 5.3 plant's*:
 - (A) *active power* consumption must not increase by more than 10% or decrease by more than the undervoltage percentage, relative to its pre-voltage disturbance *active power*; and
 - (B) current must not increase from its pre-voltage disturbance current by more than 20% of its rated current,
for at least the specified duration set out in paragraph (d); and
 - (iii) where the duration of the voltage disturbance is equal to or less than the specified duration set out in paragraph (d), the *schedule 5.3 plant's active power* consumption must return to between 90% and 110% of its pre-voltage disturbance *active power* within 500 milliseconds after T(end); and
- (4) where the voltage is below 70% of *nominal voltage*:
- (i) during the voltage disturbance, the *schedule 5.3 plant's*:
 - (A) *active power* consumption must not increase by more than 10%, relative to its pre-voltage disturbance *active power*; and
 - (B) current must not increase from its pre-voltage disturbance current by more than 20% of its rated current,
for at least the specified duration set out in paragraph (d); and
 - (ii) where the duration of the voltage disturbance is equal to or less than the specified duration set out in paragraph (d), the *schedule 5.3 plant's active power* consumption must return to between 90% and 110% of its pre-voltage disturbance *active power* within 500 milliseconds after T(end).
- (d) For the purposes of paragraph (c), the specified duration of a voltage disturbance is as set out in the following table.

<u>Voltage as a percentage of <i>nominal voltage</i></u>	<u>Voltage disturbance duration</u>
<u>Over 110% up to and including 130%</u>	<u>Per Figure S5.1a.1 in clause S5.1a.4</u>
<u>Below 90% down to and including 80%</u>	<u>10 seconds</u>
<u>Below 80% down to and including 70%</u>	<u>2 seconds</u>
<u>Below 70% down to and including 0%</u>	<u>240 milliseconds</u>

(e) A *schedule 5.3 plant* is not required to meet the requirements set out in paragraph (c) to the extent that it is prevented from doing so by changed *power system* conditions beyond the *Schedule 5.3 Participant's* reasonable control.

Minimum access standard

(f) The *minimum access standard* is the requirements set out in paragraph (g), or such lower level of performance as may be agreed by the *Network Service Provider* and *AEMO*, having regard to:

- (1) the technical characteristics of the *schedule 5.3 plant*;
- (2) the expected impact of a *credible contingency event* on the voltage at the *connection point*;
- (3) the expected impact of the *disconnection* of the *schedule 5.3 plant* on the *power system*;
- (4) the expected impact on the *power system* of the behaviour of the *schedule 5.3 plant* following a voltage disturbance; and
- (5) any other relevant factors.

(g) Subject to paragraph (h), a *schedule 5.3 plant* must respond in the following manner where a *power system* disturbance external to the *plant* causes the voltage on one or more phases at the *connection point* to vary within the following ranges:

- (1) where the voltage is between 90% and 110% of *nominal voltage*, during the disturbance:
 - (i) the *schedule 5.3 plant* must not *disconnect*; and
 - (ii) the *schedule 5.3 plant's*:
 - (A) *active power* consumption must not increase or decrease by more than 10%, relative to its pre-disturbance *active power*; and
 - (B) current must not increase by more than 20% of its rated current, relative to its pre-disturbance current,

provided that the ratio of voltage to *frequency* (as measured at the *connection point* and expressed as a percentage of *nominal voltage* and a percentage of 50Hz) does not exceed:

- (j) In carrying out assessments of proposed *negotiated access standards* under this clause, *AEMO* and the *Network Service Provider* must at a minimum, in addition to the requirements of clauses 5.3.4A(d1) and 5.3.4A(g) respectively, take into account:
- (1) the expected performance of existing *networks* and *considered projects*; and
 - (2) the expected performance of existing *schedule 5.3 plant* and other relevant projects.

S5.3.14 Instability monitoring and detection

- (a) This clause S5.3.14 only applies where:
- (1) the *schedule 5.3 plant* includes a *large inverter based resource*; and
 - (2) the *Network Service Provider* or *AEMO* considers the operation of the *large inverter based resource* could reasonably contribute to *instability in voltage, reactive power or active power* at any of its *connection points*.
- (b) In this clause S5.3.14, references to a *schedule 5.3 plant* include all such *plant* that is operated as a single integrated facility, even where different components of that facility are *connected* at separate *connection points*.

Automatic access standard

- (c) The *automatic access standard* is a *schedule 5.3 plant* must:
- (1) have *facilities* to detect *instability in voltage, reactive power and active power* at a *connection point*; and
 - (2) have *facilities* capable of *disconnecting* the *schedule 5.3 plant* for *unstable behaviour*, with *configurable enablement conditions and settings* agreed with the *Network Service Provider* and *AEMO*; and
 - (3) on detection of *instability*, promptly execute a hierarchy of actions based on *configurable trigger conditions, thresholds and timeframes* agreed with the *Network Service Provider* and *AEMO* and recorded in the *performance standards*; and
 - (4) if the *schedule 5.3 plant* is a *large inverter based load* with a *nameplate rating* of 100MW or greater, have:
 - (i) access to a *phasor measurement unit* with capability to send data for the *schedule 5.3 plant* to *AEMO* and the *Network Service Provider*; and
 - (ii) the capability to receive information from *AEMO* relating to the *schedule 5.3 plant's* contribution to *instability*, when available, in a form nominated by *AEMO*.

Minimum access standard

- (d) The *minimum access standard* is:

- (1) a schedule 5.3 plant that, under normal or planned outage conditions of the power system, can change the voltage at a connection point by more than 1% from the voltage with the plant not electrically connected, must have:
- (i) facilities to detect instability in voltage, reactive power and active power at a connection point; and
 - (ii) a process to manage instability at a connection point promptly on detection, in a manner agreed with the Network Service Provider and AEMO and recorded in the performance standards;
- (2) a schedule 5.3 plant that is a large inverter based load with a nameplate rating of 100MW or greater must have:
- (i) if required by the Network Service Provider or AEMO, access to a phasor measurement unit with the capability to send data for the schedule 5.3 plant to AEMO and the Network Service Provider; and
 - (ii) if required by AEMO, the capability to receive information from AEMO relating to the schedule 5.3 plant's contribution to instability, when available, in a form nominated by AEMO.

General requirements

- (e) A schedule 5.3 plant must have plant capabilities and control systems sufficient to ensure that operation of the schedule 5.3 plant does not cause, exacerbate or contribute to instability (including hunting of tap-changing transformer control systems) that would adversely impact other Network Users.
- (f) The hierarchy of actions under paragraph (c)(3) or process under paragraph (d)(1)(ii) must prioritise measures to eliminate the instability over disconnecting the plant.
- (g) Requirements and capabilities referable to instability are to be determined having regard to the power system stability guidelines published under clause 4.3.4(h).
- (h) If required by the Network Service Provider or AEMO, a schedule 5.3 plant must have operational arrangements and capabilities to satisfy the requirements of paragraph (e) as specified in the power system stability guidelines published under clause 4.3.4(h).
- (i) If required by the Network Service Provider or AEMO, a schedule 5.3 plant must have the capability to communicate information from its detection system to their respective control centres.
- (j) If required by the Network Service Provider, a schedule 5.3 plant must have the capability to receive a remote tripping signal from the Network Service Provider.

Schedule 5.3a Technical connection requirements for high voltage direct current networks

S5.3a.6 Protection systems and settings

- (a0) A *Schedule 5.3a Participant* must ensure that all connections of the *schedule 5.3a plant* to the *Network Service Provider's network* are protected by protection devices which effectively and safely *disconnect* any faulty circuit automatically within a time period specified by the *Network Service Provider* in accordance with the requirements of this clause S5.3a.6.

Automatic access standard

- (a) The *automatic access standard* is:
- (1) ~~*primary protection systems*~~*primary protection systems* must be provided to *disconnect* any faulted element from the *power system* within the applicable *fault clearance time* determined under clause S5.1.9(a)(1), but subject to clauses S5.1.9(k) and S5.1.9(l);
 - (2) each ~~*primary protection system*~~*primary protection system* must have sufficient redundancy to ensure that a faulted element within its protection zone is *disconnected* from the *power system* within the applicable *fault clearance time* with any single protection element (including any communications facility upon which that *protection system* depends) out of service; and
 - (3) *breaker fail protection systems* must be provided to clear faults that are not cleared by the circuit breakers controlled by the ~~*primary protection system*~~*primary protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(1).

Minimum access standard

- (b) The *minimum access standard* is:
- (1) ~~*primary protection systems*~~*primary protection systems* must be provided to *disconnect* from the *power system* any faulted element within their respective protection zones within the applicable *fault clearance time* determined under clause S5.1.9(a)(2), but subject to clauses S5.1.9(k) and S5.1.9(l); and
 - (2) if a *fault clearance time* determined under clause S5.1.9(a)(2) for a protection zone is less than 10 seconds, a *breaker fail protection system* must be provided to clear from the *power system* any fault within that protection zone that is not cleared by the circuit breakers controlled by the ~~*primary protection system*~~*primary protection system*, within the applicable *fault clearance time* determined under clause S5.1.9(a)(3).

General requirements

- (c) The *Network Service Provider* and the *Schedule 5.3a Participant* must cooperate in the design and implementation of *protection systems* to comply with this clause, including cooperation with regard to:

- (1) the use of *current transformer* and *voltage transformer* secondary circuits (or equivalent) of one party by the *protection system* of the other;
 - (2) tripping of one party's circuit breakers by a *protection system* of the other party; and
 - (3) co-ordination of *protection system* settings to ensure inter-operation.
- (d) The *Schedule 5.3a Participant* must ensure that the protection settings of its protective equipment grade with the *Network Service Provider's transmission system* or *distribution system* protection settings. Similarly, the grading requirements of fuses must be co-ordinated with the *Network Service Provider*. The *Schedule 5.3a Participant* must provide details of the protection scheme implemented for the *schedule 5.3a plant* to the *Network Service Provider* and must liaise with the *Network Service Provider* when determining gradings and settings.
- (e) The application of settings of the ~~protection scheme~~*protection system* must be undertaken in accordance with clause S5.3a.2.
- (f) Before the *schedule 5.3a plant* is connected to the *Network Service Provider's transmission system* or *distribution system*, the *protection system* must be tested and the *Schedule 5.3a Participant* must submit the appropriate test certificate to the *Network Service Provider*.

S5.3a.7 Short circuit ratio

- (a) [Deleted]

Minimum access standard

- (b) The *minimum access standard* is an installation comprised of electrical *plant* must have *plant* capability sufficient to operate stably and remain *connected* at a *short circuit ratio* of 3.0, assessed in accordance with the methodology prescribed in the *system strength impact assessment guidelines*, and subject to paragraph (e).

General requirements

- (c) The *performance standards* in the *connection agreement* must record:
- (1) the agreed value of the *short circuit ratio* which must be the minimum of 3.0 and the value at which the *plant* has *plant* capability sufficient to operate stably and remain *connected*; and
 - (2) the *power transfer capability* used to calculate the value.
- (d) For paragraphs (b) and (c), the *plant* capability may be demonstrated with any appropriate *control system* and/or *protection system* settings. The settings used may be different to the setting required for compliance with other *performance standards* established under this schedule.
- (e) If the *plant* is not otherwise capable of meeting the *minimum access standard*, the *Schedule 5.3a Participant* may, if agreed by AEMO, the

Network Service Provider and the System Strength Service Provider, achieve compliance by demonstrating it has:

- (1) in accordance with paragraph (f), legally binding commitments to make additional investment in its *plant* or for the supply to it of services to remedy, at its cost, the shortfall in capability, either on *connection* or in agreed circumstances (such as the occurrence of an event that results in a change to the *three phase fault level* at the *connection point*); together with
- (2) operational arrangements agreed with the *Network Service Provider* that apply when the investment or services referred to in subparagraph (1) have not yet been made or are not available.

(f) For paragraph (e)(1), the *Schedule 5.3a Participant* may:

- (1) reach agreement with the *Network Service Provider* for the *Schedule 5.3a Participant* to undertake investment in its *plant* to achieve *plant* capability sufficient to operate stably and remain *connected* at a *short circuit ratio* of 3.0; or
- (2) procure from the *Network Service Provider*, the *System Strength Service Provider* or another *Registered Participant*, services to enable the *plant* to operate stably and remain *connected* at a *short circuit ratio* of 3.0 but calculated using a *three phase fault level* at the *connection point* that excludes any contribution from the facilities providing the service.

S5.3a.14 Disturbance ride through and response capability

- (a) For the purpose of this clause S5.3a.14, a disturbance (other than a *frequency disturbance*) is taken to end when the voltage at the *connection point* recovers to within 90% to 110 % of *nominal voltage* and remains within that range for at least 20 milliseconds.

Automatic access standard

- (b) The *automatic access standard* is a *schedule 5.3a plant* must:
 - (1) remain in *continuous uninterrupted operation* for the types of disturbances specified for the *automatic access standard* for *schedule 5.2 plant* in clauses S5.2.5.5(c) and (d);
 - (2) have *facilities* capable of supplying or absorbing capacitive reactive current and inductive reactive current at each *connection point* at levels equivalent to those specified for the *automatic access standard* for *schedule 5.2 plant* in clauses S5.2.5.5A(f)(1) and (f)(2), in the conditions specified in those clauses; and
 - (3) within 100 milliseconds after the end of the disturbance, reach at least 95% of:
 - (i) the pre-disturbance *power transfer* level; or
 - (ii) during a *frequency* disturbance, a level of *power transfer* agreed with *AEMO* and the *Network Service Provider*, consistent with the *schedule 5.3a plant's* *frequency* control arrangements (if applicable),

with, in the case of subparagraphs (2) and (3), equivalent requirements, conditions and exclusions as those specified in clauses S5.2.5.5A(f), (g), (h) and (i).

Minimum access standard

- (c) The *minimum access standard* is a *schedule 5.3a plant* must:
- (1) remain in *continuous uninterrupted operation* for the types of disturbances specified for the *minimum access standard* for *schedule 5.2 plant* in clauses S5.2.5.5(k) and (l);
 - (2) have *facilities* capable of supplying or absorbing capacitive reactive current and inductive reactive current at each *connection point* at levels equivalent to those specified for the *minimum access standard* for *schedule 5.2 plant* in clauses S5.2.5.5A(m)(1) and (m)(2) in the conditions specified in those clauses; and
 - (3) from a period after the end of the disturbance agreed with the *Network Service Provider* and *AEMO* (which period may differ according to the type of fault), return to at least 95% of:
 - (i) the pre-disturbance *power transfer* level; or
 - (ii) during a *frequency* disturbance, a level of *power transfer* agreed with *AEMO* and the *Network Service Provider*, consistent with the *schedule 5.3a plant's* *frequency* control arrangements (if applicable),

with, in the case of subparagraphs (2) and (3), equivalent requirements, conditions and exclusions as those specified in clauses S5.2.5.5A(m), (n) and (o).

Negotiated access standard

- (d) The provisions applicable to *negotiated access standards* for *schedule 5.2 plant* in clause S5.2.5.5 apply to the *Schedule 5.3a Participant*, the *Network Service Provider* and *AEMO* in respect of the *schedule 5.3a plant*, to the extent relevant to that *plant*.

General requirements

- (e) The general requirements applicable to *schedule 5.2 plant* in clauses S5.2.5.5 and S5.2.5.5A apply in respect of the *schedule 5.3a plant*, to the extent relevant to that *plant*, and a reference in those requirements to any other clause of schedule 5.2 is taken to refer to the corresponding clause of this schedule 5.3a.

S5.5.6A Bidirectional units smaller than ~~305~~MW data

A *Schedule 5.2 Participant* that connects a *bidirectional unit* smaller than ~~305~~ MW or *bidirectional units* totalling less than ~~305~~ MW to a *connection point* to a *distribution network* must submit registered system planning data and registered data to *AEMO* and the relevant *Network Service Provider* in accordance with the requirements specified in the *Power System Model Guidelines*, *Power System Design Data Sheet* and *Power System Setting Data Sheet*.

Codes:

S = Standard Planning Data

D = Detailed Planning Data

R = Registered Data (R1 pre-connection, R2 post-connection)

AEMO advisory matter

A matter that relates to *AEMO's* functions under the *NEL* and a matter in which *AEMO* has a role under clause 5.3.4B or in schedules 5.1a, 5.1, 5.2, 5.3 and 5.3a. Advice on the acceptability of *negotiated access standards* under the following clauses are deemed to be *AEMO advisory matters*: S5.1.9, S5.2.5.1, S5.2.5.3 to S5.2.5.5, S5.2.5.5A, S5.2.5.7 to S5.2.5.15, S5.2.6.1, S5.2.6.2, S5.3.5, S5.3.11, S5.3.12, S5.3.13, S5.3.14, S5.3a.4.1, S5.3a.4.2, S5.3a.7, S5.3a.8 and S5.3a.13 to S5.3a.16.

B2B Proposal

A proposal for *B2B Procedures*, or a change to the *B2B Procedures*, which is the subject of consultation by the *Information Exchange Committee*.

back-up protection system

A protection system that is designed to operate when the relevant primary protection(s) fail to clear a fault in the applicable fault clearance time.

inverter based load

Plant (other than a *production unit*) that is supplied by power electronics, including inverters, converters and rectifiers, and potentially susceptible to ~~inverter power electronic control instability, and that is classified as an inverter based load applying criteria specified in the system strength impact assessment guidelines.~~

large inverter based load

An inverter based load with a nameplate rating of 30MW or greater.

large inverter based resource

An *inverter based resource* that is either of the following:

(a) an asynchronous production unit classified as a *large inverter based resource* applying criteria specified in the *system strength impact assessment guidelines*; or

(b) a large inverter based load.

primary frequency response

An automatic change in a *generating system's active power* output, to oppose or arrest *frequency* changes, measured at or behind the *generating system's connection point*.

primary protection system

A protection system that is designed to be the initial response to a fault.

single contingency

In respect of a *transmission network* or *distribution network* and *Network Users*, a sequence of related events which result in the removal from service of one *Network User*, *transmission line* or *distribution line*, or *transformer*. The sequence of events may include the application and clearance of a fault of defined severity.

11.[xxx] Rules consequential on making of the National Electricity Amendment (Improving the NEM Access Standards – Package 2) Rule 2026

11.[XXX].1 Definitions

For the purposes of this rule 11.XXX:

Agreed Standard means a *negotiated access standard* that has been negotiated and agreed by the *Network Service Provider* in accordance with clause 5.3.4A and applying the old access standards, and is capable of forming part of the terms and conditions of a *connection agreement as the performance standard applicable to the plant* for the relevant technical requirement.

Amending Rule means the *National Electricity Amendment (Improving the NEM Access Standards - Package 2) Rule 2026*.

commencement date means [date], being the date on which the Amending Rule commences operation.

Conditional Standard means a standard of performance that is agreed subject to certain conditions being satisfied.

Existing Application to Connect has the meaning given in clause 11.[XXX].3(a).

Existing Connection Agreement means a *connection agreement* entered into before the commencement date.

Existing Connection Enquiry has the meaning given in clause 11.[XXX].2(a).

new access standards means the technical connection requirements for *schedule 5.3 plant* set out in Schedule 5.3, including the applicable requirements for an *automatic access standard, minimum access standard or negotiated access standard*, as in force immediately after the commencement date.

old access standards means the technical connection requirements for *schedule 5.3 plant* set out in Schedule 5.3, including the applicable requirements for an *automatic access standard, minimum access standard or negotiated access standard*, as in force immediately prior to the commencement date.

transitional date means [6 months after the commencement date]

1.[XXX].1 Application of the Amending Rule to Existing Connection Enquiries

(a) This clause 11.[XXX].2 applies where, before the commencement date, a *Connection Applicant* has, in respect of a *schedule 5.3 plant* that the *Connection Applicant* proposes to connect:

- (1) made a valid *connection enquiry* in accordance with clause 5.3.2 or 5.3A.5 (**Existing Connection Enquiry**); and
- (2) not made an *application to connect* to a *Network Service Provider* under clause 5.3.4 or 5.3A.9.

(b) On and from the commencement date:

- (1) the new access standards apply to the *schedule 5.3 plant* that the *Connection Applicant* proposes to connect; and

- (2) the Existing Connection Enquiry will be taken to be a valid connection enquiry with respect to the schedule 5.3 plant.
- (c) Within 10 business days after the commencement date, the Network Service Provider must provide written notification to a Connection Applicant to which this clause 11.[XXX].2 applies that the new access standards will apply to the schedule 5.3 plant.
- (d) If the Network Service Provider has provided details of the technical requirements relevant to the proposed schedule 5.3 plant under the old access standards prior to the commencement date, the Network Service Provider must provide the Connection Applicant with written details of the relevant technical requirements under the new access standards.
- (e) The time for the Network Service Provider to provide the Connection Applicant with:
- (1) written details of the relevant technical requirements under clause 5.3.3(b1) is extended to 30 business days from the commencement date;
 - (2) a preliminary response under clause 5.3A.7 is extended to 15 business days from the commencement date; and
 - (3) a detailed response under clause 5.3A.8 is extended to 30 business days from the commencement date.
- (f) Where the Network Service Provider has charged the Connection Applicant any fees or charges with respect to an Existing Connection Enquiry, the Network Service Provider must not charge the Connection Applicant any additional fees or charges on or from the commencement date with respect to such Existing Connection Enquiry, except to the extent necessary to cover the reasonable costs of work required to provide any relevant information under paragraph (d). For the avoidance of doubt, this clause does not preclude a Network Service Provider recovering an application fee from the Connection Applicant under clauses 5.3.4(b) and 5.3A.9.

11.[XXX].3 Application of the Amending Rule to Existing Application to Connect

- (a) This clause 11.[XXX].3 applies where, before the commencement date, a Connection Applicant has, in respect of a schedule 5.3 plant that the Connection Applicant proposes to connect:
- (1) made a valid application to connect (**Existing Application to Connect**); and
 - (2) not yet received an offer to connect under clause 5.3.6 or 5.3A.10.
- (b) Subject to paragraph (f), on and from the commencement date:
- (1) the new access standards apply to the schedule 5.3 plant that the Connection Applicant proposes to connect;
 - (2) the Existing Application to Connect will be taken to be a valid application to connect with respect to the schedule 5.3 plant.

Application of new access standards

- (c) No later than 10 business days after the commencement date, if the Connection Applicant has not given notice of an election under paragraph (f) by that date, the Network Service Provider must provide written notification to the Connection Applicant that the new access standards will apply to the schedule 5.3 plant.
- (d) No later than 30 business days after the commencement date, if the Connection Applicant has not given notice of an election under paragraph (f) by that date, the Network Service Provider must provide the Connection Applicant with written details of:
- (1) the relevant technical requirements under the new access standards; and
 - (2) any further information or data that the Connection Applicant needs to provide to the Network Service Provider.
- (e) Where the new access standards are to apply:
- (1) the Network Service Provider may extend the time period referred to in clause 5.3.6(a) to reasonably allow for any additional time taken in excess of the period allowed in the preliminary program that is necessary to take account of the differences between the old access standards and the new access standards; and
 - (2) where the Network Service Provider has charged the Connection Applicant any fees or charges with respect to the Existing Application to Connect, the Network Service Provider must not charge the Connection Applicant any additional fees or charges on or from the commencement date with respect to the Existing Application to Connect, except to the extent necessary to cover the reasonable costs of work required to notify the Connection Applicant and provide any relevant information under paragraph (d).

Election to apply old access standards

- (f) Despite paragraph (b) and notwithstanding any notification that may have been given under paragraph (c) or (d), a Connection Applicant to which this clause 11.[XXX].2 applies may, until the transitional date, elect to continue negotiating performance standards for the schedule 5.3 plant in accordance with the old access standards. A Connection Applicant that has made an election under this paragraph:
- (1) must notify the Network Service Provider of its election as soon as reasonably practicable; and
 - (2) may withdraw its election at any time by giving notice to the Network Service Provider.
- (g) Where, subject to paragraph (h), on or before the transitional date, all standards of performance relevant to the plant are either Agreed Standards or Conditional Standards in the reasonable opinion of the Network Service Provider (consulting with AEMO in respect of any AEMO advisory matter), the Network Service Provider must:

(1) within 10 business days after receiving a written request from the Connection Applicant, provide written confirmation to the Connection Applicant:

(i) that all standards of performance relevant to the schedule 5.3 plant are either Agreed Standards or Conditional Standards; and

(ii) identifying any standards of performance that are Conditional Standards, including any applicable conditions and the date for satisfaction of those conditions; and

(2) otherwise, use its reasonable endeavours to provide, within 10 business days after the transitional date, the written confirmation at subparagraphs (g)(1)(i) and (g)(1)(ii) to the relevant Connection Applicant.

(h) Where:

(1) on the transitional date there are any standards of performance relevant to the schedule 5.3 plant are neither Agreed Standards nor Conditional Standards; or

(2) a condition for satisfaction of a Conditional Standard is not satisfied by the relevant date for satisfaction,

then on and from the transitional date or the date on which the relevant condition was required to be satisfied (as relevant):

(3) any Conditional Standards will be taken to have not been agreed;

(4) the new access standards apply for the purposes of determining all performance standards that apply to the schedule 5.3 plant that the Connection Applicant proposes to connect;

(5) the Existing Application to Connect will be taken to be a valid application to connect with respect to the proposed schedule 5.3 plant;

(6) the Network Service Provider must, in consultation with AEMO, within 10 business days from the transitional date or the date on which the relevant condition was required to be satisfied (as relevant):

(i) notify the Connection Applicant that the new access standards will apply to the Existing Application to Connect; and

(ii) provide the Connection Applicant notified under subparagraph (i) with the further information and notice specified in subparagraph (d) (where applicable); and

(7) the Network Service Provider must comply with the requirements of paragraph (e).

(i) If the Network Service Provider provides written confirmation to a Connection Applicant under subparagraphs (g)(1) or (g)(2) (as applicable) and all conditions for satisfaction of any Conditional Standard are satisfied by the relevant date for satisfaction, the old access standards apply for the purposes of determining the performance standards that apply to the schedule 5.3 plant that the Connection Applicant proposes to connect under that Existing Application to Connect.

11.[XXX].4 Application of the Amending Rule to existing offers to connect

- (a) This clause 11.[XXX].4 applies where, before the commencement date, a *Connection Applicant* has:
- (1) received a valid offer to *connect* from the relevant *Network Service Provider* in respect of an *application to connect*; and
 - (2) not entered into a *connection agreement* with the relevant *Network Service Provider* in respect of that *application to connect*.
- (b) On and from the commencement date, the old access standards apply to the *plant* that the *Connection Applicant* proposes to *connect* under that offer to *connect*.

11.[XXXX].5 Application of the Amending Rule to Existing Connection Agreements

- (a) The Amending Rule is neither intended to, nor to be read or construed as having, the effect of:
- (1) altering the terms of an Existing Connection Agreement;
 - (2) altering the contractual rights or obligations of any of the parties under an Existing Connection Agreement; or
 - (3) relieving the parties under any such Existing Connection Agreement of their contractual obligations under such an agreement.
- (b) Subject to paragraph (c), if, after the commencement date, a *Schedule 5.3 Participant* who has entered into an Existing Connection Agreement is required or proposes to amend, in accordance with the *Rules*, any of the *performance standards* set out in that Existing Connection Agreement, then the new access standards apply for the purposes of amending such *performance standards*.
- (c) The old access standards apply to a *Schedule 5.3 Participant* who, prior to the commencement date, has submitted a proposal to alter *schedule 5.3 plant* under clause 5.3.12(b), unless:
- (1) *AEMO*, the *Schedule 5.3 Participant* and the relevant *Network Service Provider* agree otherwise; or
 - (2) in *AEMO*'s reasonable opinion (in respect of an *AEMO advisory matter*), there will be an adverse impact on *power system security* or achievement of the *system standards* as a result of the application of the old access standards.

11.[XXX].6 Amendments to AEMO guidelines

- (a) *AEMO* must review the following guidelines and make amendments that *AEMO* considers to be necessary or desirable to take into account the Amending Rule:
- (1) the *Power System Model Guidelines*;
 - (2) the guidelines for *power system* stability published under clause 4.3.4(h); and
 - (3) the *System Strength Impact Assessment Guidelines*.

- (b) In amending the documents referred to in paragraph (a), AEMO must follow the process for amending those documents specified in the Rules.
- (c) Amendments made in accordance with paragraph (a) must be *published* and take effect no later than twelve months after the commencement date.
- (d) From the commencement date and until the guidelines referred to in paragraph (a) are amended to take into account the Amending Rule, references to *large inverter based load* in those guidelines are taken to have the meaning given to that term in the Amending Rule.